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EDITORIAL NOTES.

The Scandal of Coal Prices.

THE Committee appointed by the Board of Trade to consider the question of the high retail price of coal in London during recent months have issued their report; and it is a document of far-reaching and grave significance—not only to householders, but nationally. The report was circulated in time for publication on the morning of Good Friday. It did not, however, supply "good" reading for those concerned in the gross imposition upon the public of excessive coal prices; and there must consequently have been some consonance between their feelings and the day itself. The report, couched in judicial and modest diction, is a complete conviction of the coalowners and dealers. In effect, it accuses them of a betrayal of their trust as controllers of our chief native resource, of want of patriotism, of plundering the community in times of national stress, and of collusion in obtaining and sharing undue profits. No other interpretation of the report is warranted or is possible. It wholly justifies the criticisms that have been made in these columns on previous occasions, which criticisms have been sneered at by the spokesmen for the coal interests, and the coal journals have sought to dispose of them by the weakest of puerilities. These all vanish before the declarations of the Committee. Those soft sayings of the apologists and defenders of the coalowners as to the operation of the law of supply and demand, as to there being no understandings and no definite agreements but open competition, as to increased costs and the shortness of labour and other matters justifying all that could be squeezed out of the community and out of industry, are set in their proper place by the report. Either the coal papers do not know their own masters and the inner workings of the trade, and have been shielding them in ignorance, or they have gone much astray in trying to defend what they knew to be in large part purely a sham. Yet the circumstances to any observant student of the position were perfectly plain.

The allegations of the Committee really amount to a charge of conspiracy between the coalowners and the merchants to sweat the utmost penny out of the public and out of industry. The coal merchants are already throwing the blame on to the coalowners, and insinuate that they have been unwillingly immeshed by the powerful upper hand of the latter. The coalowners up to the present time have remained silent. It is very doubtful whether any effective reply could be made by them to the carefully considered conclusion to a carefully conducted inquiry. The Committee assert categorically that—though 130,000 miners have joined the Colours, though freights have risen (to an extortionate amount may be interpolated), though railway costs have advanced owing to diminished railway facilities for ordinary traffic through the pressure of Government requirements—all these things only justify an additional price of 3s. per ton, whereas consumers have had to pay increases of from 7s. to 11s. per ton. This applies largely to industrial consumers, and to householders. But there follows a worse indictment regarding prices. Though there may not be definitely constituted "rings" in the coal trade, there are, the Committee state, evidently opportunities for conference among those chiefly concerned which do, in effect, commonly lead to concerted action as to prices. It does not matter what name is given to the "concerted action," whether an ugly or a polite one, the result is much the same.

In this case, something that has not a nice appearance is unmasked, and that is the collusion which brings additional profit to the coalowners without making public disclosure of the fact. The coalowners and the merchants have a single interest in high prices. A few leading firms arbitrarily decide upon the increase of price which they intend to command; and on the morrow this figure becomes the public price of the day. The pit-head prices are raised 6d. per ton on each 1s. advance of the public price for all buyers alike, and does not fall again for any buyer until the public price falls. The collusion goes further. The colliery owners have, during the past winter, received 4s. 6d. per ton out of the rise of 9s. from the summer price of coal sold under contract—this being the arrangement which gives the owners and merchants a common interest in higher prices. And they talk glibly of the operation of the law of supply and demand! Industries are the victims of the same arbitrary rule in the fixing of price. For them the "law" of supply and demand is subject to such super-tax in the way of price as the colliery owners in conference choose to impose. Competition in such circumstances is not a really effective force. The Committee also direct attention (and emphasize the point by a second reference) to recent and current action on the part of certain coalowners which is not by any means to their credit, is repugnant to the public interests, and has naturally caused considerable dissatisfaction among the buyers of coal under contract—including (as has been mentioned in the "JOURNAL" previously) gas undertakings. This action is a reduction of the delivery of scheduled quantities under contract—the excuse being shortage of output at the collieries, while usually the real object has been to have a larger amount of coal at disposal to place on the open market at the enhanced prices fixed by the processes already referred to. There again the Committee do not spare the colliery owners. While entertaining "grave "doubts concerning the legality of making any abatement at "all so long as the output is sufficient to satisfy the con-"tract," the Committee cannot but regard this action as "highly questionable" (and reprehensible, might have been added) when it enables the coalowner to sell a larger quantity of free coal at a greatly enhanced price due to national emergency.

The Government cannot ignore such a report as this. Whatever is done, however, must be done promptly; for although the prices of coal have been falling a little, and are likely to fall again on this report, there are all the indications, in contracts already made and in quotations for future delivery, that prices will be maintained at unreasonably high figures, if some preventive measures are not taken. The Committee see the danger of this. What would it mean? That the few would continue to enrich themselves unduly at the expense of the many, and that industry and trade, already heavily handicapped by the adverse current conditions, would be further hampered and reduced in efficiency as the national money-making machines upon which the country must to-day more than ever rely for revenue. We may depend upon it that this aspect of the matter will not be overlooked when Parliament reassembles, and that the question will be pointedly put to the Government as to why the country should in these times be made poorer and its industries less efficient, and therefore less productive, so as to gratify the greed of a few coalowners. Through their grasping for profit, to what pass have they brought themselves? A stronger indictment there could not be of the betrayal of their trust as the controllers of the chief of our home resources, especially in these times of national trial and pressure, than is contained in this pregnant passage from the Committee's report: "The impression "left upon our minds by the evidence and the information "before us is that the conduct of an industry on which such "great national interests depend cannot safely be left in the "time of crisis to the working of an unregulated system of "supply and demand. . . . We are not thinking alone "of the comfort and convenience of the consumer, but of "the vital importance to the safety, credit, and well-being "of the country, of securing that its coal supply should, as "regards quantity and price, be maintained at a level com-"mensurate with national requirements." It is plain from this that the Committee do not think that the "safety, "credit, and well-being" of the country are secured under the present conditions; and of this large consumers were fully convinced long before this inquiry and report. It is

highly essential that the Government should be very solicitous about the supply of coal to gas-works in view of, for high explosive purposes, the extraction of toluol from the gas and tar; and therefore they should not, by inaction, drive the gas undertakings of the country to the production of a larger proportion of carburetted water gas.

As to the recommendations of the Committee, they adopt the principle that, at a time like this, the nation should have first call upon its own coal supplies. This is only common sense. The same contention was made in the "JOURNAL" lately when dealing with the amount of coal that was still being exported, while home industries were complaining of a deficiency of supply, and while the dealers were making shortness of supply one of the excuses for extortionate prices at home. The Committee rightly, and justly to home users, recommend a restriction of all exports to neutral countries (not to our Allies) with a view to providing at home a more adequate supply during the war. This is only reasonable. But there is another difficulty; and we are not sure the Committee do not foresee this. Is it not possible that men who have been acting as the coalowners (with few exceptions) have been doing during the war might, without control is exercised over them, take some other course to maintain prices? The most obvious course would be the restriction of supply. The Committee, however, express the hope that the colliery owners and the miners will realize that, in the present emergency, any sacrifice they can make to increase production will be a mark and a sign of their patriotism. Another recommendation of the Committee could easily be utilized to cause higher prices. It has been suggested before in the "JOURNAL" that gas undertakings would be well-advised to advance during the summer months their schedule delivery quantities, so as to obtain possession of good stocks before the next winter comes. The Committee advise the Government to facilitate the accumulation of large reserves near London for the supply of householders next winter. In this event, it would be necessary for the Government to assure that this action was not used to detrimentally affect other parts of the country and its industries.

Then the Government are indirectly condemned by the Committee for the policy they have been pursuing as to interned steamers; for it is suggested by them that the freight rates for such steamers should be further reduced to gas and other public utility companies in London, and that something should be done to ensure that the advantage of the lower rates should go to the consumers and not to the shareholders. This, the Committee acknowledge, is already provided for under the sliding-scale control of gas companies. They further urge that additional enemy ships condemned by the Prize Courts should be taken over by the Government, and used for coal transport. The Government ought to recognize that their policy should not be the protection of excessive freight rates in the interests of shipowners, but the defence of the community generally against such rates, and the utilization of all their resources to that end. In this connection, the Committee allude to the importance of a cheap supply of gas to the poorer consumers of London; and, while they do not add anything new to the information regarding the present exceptional position of the price of gas in London owing to the extraordinary freightage for coal, they have performed a public service in calling attention to it. Regarding the pooling of railway waggons, the Committee are of opinion that this would be impracticable; but they do urge upon the Railway Executive Committee to adopt every possible expedient to ensure the rapid and regular transport of coal to London and the South.

The most important recommendation of the Committee, however—it contains a warning to the coalowners—is that, "if prices do not shortly return to a reasonable level, the "Government should consider a scheme for assuming con-"trol of the output of collieries during the continuance of "the war." The suggested action depends upon the "if." But the proposal is a drastic one; and we are doubtful as to its workability. The collieries, with all their attendant responsibilities, are not in line with the railways, over which the Government are exercising control through the Railway Executive Committee. A better plan would be for some regulating legislation, or mechanism for fixing maximum prices (this the Committee do not consider immediately practicable), without interfering with present organization. It must be confessed that the Government have not been very fortunate in their efforts to ameliorate troubles in the distribution work of the country. Practical men are full of criticism and suggestion as to how things might be bettered on the railways; but amendment moves sluggishly. In bringing into service interned steamers, the Government made another false move, which, while producing partial relief in available tonnage, incensed, on account of the high rates of freight charged, those who suffered without complaint the loss in the country's service of their own or chartered steamers. The Government have not in these directions produced happy results for the country internally, while admittedly they have done well in utilizing the existing means of transport in the movement of men and materials in connection with the war.

However, the report of the Committee is a highly valuable one; and it has, in our opinion, done more to direct pointed attention to a condition of things in connection with the control and the pricing of coal than anything done hitherto. In the past, there has been grumbling on the part of consumers, and ill-effects upon industry and the community; but nothing has been accomplished in producing better conditions. If something is now done that will have good result for the period of the war and a time after, there will be cause for thankfulness; if something is done that will have permanent effect now that the Government have been shown what unregulated coal ownership means, so much the better.

Labour's Claims.

WHILE the sons of Great Britain and Ireland are, for a fixed rate of pay, and for a varying number of hours at a stretch—pay and hours being undefined by a trade union—most courageously risking their lives, and incurring all sorts of hardships, in the grim determination to uphold the honour of this country and defend it and their and our hearths against the nation's enemies, we have been, and are still in some quarters, faced by the spectacle at home of men and masters haggling over additional halfpence per hour, men refusing to work the time during a week for which they are quite physically fit, and, through disagreement and laziness, munitions of war required on land and sea delayed in output and transit, and the food and other requirements for the Continent hindered. In several directions, masters and men alike seem to be animated by a desire—a dominating desire—to take as much plunder as they possibly can out of this war. We look on the one picture with a lump in the throat, with intense admiration for the bravery of the nation's sons abroad, and with an ardent wish that time was not against us being there with them. We look on the other picture; and the feelings aroused are those of the deepest disgust. It is, however, a pleasure to know that the conditions at home, as pictured above, are not universal in the ranks of labour. The majority of the men are as patriotic as the best among us; it is the comparative few who impede work with a callousness that, in the circumstances, makes one's blood boil.

This is all general, and only applies where the strictures are deserved. Admittedly, the cost of living has risen materially. But almost throughout the country, in connection with industries and trades, including the gas industry, special war bonuses are being paid to employees—generally ranging, as mentioned in a previous issue, from 3s. on wage payments of 30s. and under per week, to 2s. and 1s. as the wages increase in weekly amount. But the miners and the dockers out of all the workers of the country, and yet not by far the worst paid among workmen, are making the highest demands on their employers. We do not say that, considering the position of certain coalowners, the men are altogether to blame. They are only taking pattern by their masters, and desiring to participate in some of the undue profits which the war has made it possible for the less conscientious of the owners to secure. To the case of the dockers—at any rate the London ones—the same argument cannot be applied. The miners, it will be remembered, asked for a 20 per cent. advance in wages; and they did not expect to get this without negotiation and some struggling. The 20 per cent. is much in excess of the war bonuses being paid in other trades. The first, and the expected, refusal has been made. The Mining Association of Great Britain have declined to deal with the matter as a general one. It is a question, Sir T. Ratcliffe Ellis says on behalf of the Association, which comes partly within the purview of the Conciliation Boards; and, owing to the widely varying rates of pay in different districts, uniformity is impossible, and therefore the demand can only be dealt with locally. The next move will have to come from the side of the men; but it is felt that good sense will prevail among them, and

that there will be no interruption of work. To the South Wales men, the leaders of the District Miners' Federation have made a strong appeal, asking them to remember that the supplies of ammunition, and the maintenance of the Navy in the North Sea, and of the active work in the Dardanelles, all depend upon the regular and sufficient supply of fuel. What applies to South Wales applies, in large measure, to other coal-fields; for, though they may not produce coal for the supply of the Navy, they do win coal for the country's industries which are essential to various forms of production for carrying on the war, and for maintaining the manufacturing output on which so much reliance has to be placed in connection with national financing. We believe the miners (save in sporadic cases) feel this; and that, as a class, they would be the last men in the world to jeopardize things in these critical days by stopping the output of coal. They will, we feel sure—the country urgently needing them—try to settle their difference over the claim as to the bonus by other means than a cessation of work, which would be fatal to their country.

With the dockers, there will be little sympathy. We know what happened at Liverpool—of how ships were delayed which contained necessaries for our Army and Navy. The personal appeal of Lord Kitchener to the men; the impotence through many days of the Union leaders to prevail upon them to return to work—these are matters of history; but they do not form the most pleasant page of reading in the detailed narrative of these times. The case of the dockers engaged in the Port of London is, if anything, worse. They have had an increase equal to 3s. a week, costing the Port of London Authority an estimated sum of £130,000 per annum, to cover which dock dues and charges have been increased by 7½ per cent. This is a justifiable 7½ per cent.; but it falls upon industries, trades, and commerce already heavily burdened. The men, however, are not satisfied; they want still more. With prominent shipowners a direct agreement has been effected with the view of trying to satisfy these men, and to get waiting work carried out; but the Port Authority will not accept the responsibility of still further handicapping the trade of the port by the heavy exactions. The trade of the port includes a not inconsiderable tonnage in connection with London and neighbouring gas undertakings, which are wrestling with all their power against the current oppressive state of things. It is to say the least sickening that these inconsiderate tactics of labour should be applied at this particular time, when patriotism should be the environing atmosphere, and its spirit should rule conduct. These labour questions are national ones. They bear upon the war, they bear upon industry, and they bear upon the community and upon the nation's safety. More could be said showing the very peculiar twist of conduct that exists in some small parts of the labour world, and yet not so small as to be free from ill-effect—such as men who are already in receipt of war bonuses refusing to work on Mondays, and then having to be employed overtime, at increased rates of pay, on other days of the week. The men of the gas industry are generally showing themselves to be of a different stamp. They are men and Britons.

Inadequacy of Inland Transit Systems.

The transit arrangements of this country have been lately put to a very severe test, and have been found wanting in meeting requirements at the time of maximum pressure and stress. The period has been unusual; but a complete test of the adequacy and efficiency of any system can only be made when the heaviest load and the greatest strain are upon it. Our railways have been able to meet the needs of the War Office and the Admiralty, but only by dislocation and delay in all other traffic; and this to the industries of the country has meant very considerable loss. Often even in normal times, there has been complaint regarding delays in the transmission of goods; but the lesson of the experiences of recent months and the present condition of things is that there must be revision. A new standard of transit requirement has been set up by the war, and there must be in one way or another a working to this standard; for it is clear that in international or national emergencies, as well as for ordinary traffic, adequacy and rapidity are vital points. It is not a little mortifying to the Britisher, while the railways at home are congested, and while he is thereby suffering increased costs and delays, to read such glowing accounts of the enormous advantage in point of mobility that Germany possesses through its splendid system of railways, with about it not only much evidence of normal utility, but of strategic significance. And not only the railways, but the waterways of Germany have also been vastly improved. Upon them millions and millions of pounds have been spent. The same is the case in France, and to a smaller extent in Belgium. These developments have been a financial obligation of the State, and in part State *cum* local authorities.

Adequacy of the means of transmission preventing delays of raw and finished goods, subscribes to industrial economy and efficiency, and promotes advantages for the whole community. During the recent congestion of our railways, the gas industry has suffered considerably from delays in supplies of coal, and so costs of production have been raised. Business, too, has been impeded, and customers incommoded, through the delays in the delivery of gas appliances from the manufacturers. The experience of the gas industry has been that of other industries. It has been asserted by good authority that greater systematization and intercontrol of the railways and of the rolling stocks than have prevailed would have obviated some of this. But even this would not have compensated for the inadequacy of the means of transmission about the country. Something will perhaps be done hereafter that should have been done before. Good might accrue in this direction if Parliament, after the present experience, would, when we return to days of peace, devote some part of its attention to matters of real national urgency and protection, instead of disturbing the public peace so much by legislation which only the few want, and the majority have shown signs of revolting against. While other countries find in industry the means of maintaining and promoting national prosperity, and while Germany sees fit to aid actively and substantially in industrial development, our own Government only look upon industry as the milch cow which will afford sustenance to their various schemes. While Home Rule, Welsh Church Disestablishment, National Insurance, and many other domestic topics have for years occupied consideration, absorbing time, and creating discord, the report of the Royal Commission on Canals—treating of matters of great practical value to the country—has been ignored for nearly six years. There has been nothing done in regard to it. There, with all its pregnant recommendations, it has been lying on one side. In face of such a report, the matter of developing the means of waterway communication would have been in any other country promptly taken up by the State, with the view of increasing the efficiency of inland transmission and distribution. Had legislation been passed, and had some of the improvements been promptly and seriously put in hand, parts of the country might thus early have been feeling some relief. Now and for some time hence, the Government will be too busy to take this much-needed work into consideration. Nevertheless, this matter and railway reform must be kept well in front of the Government and Parliament when we get back to normal times. The Waterways Association will no doubt do their share in keeping things moving within sight of our legislators. They have received a large amount of support throughout the country, notably from the technical, industrial, and trading organizations—the Institution of Gas Engineers and the Society of British Gas Industries among others.

Not only have the recent strain and congestion upon our railway systems refreshened interest in this question of waterway development, but there are indications of local ambitions having been raised, with appreciation of the advantages of waterway development in the promotion of local prosperity. In the last issued "Engineering Supplement" of "The Times," it is stated that the Nottingham Corporation have now before Parliament a scheme for improving the navigation of the Humber and the Trent; and it is thought that the next great engineering waterway scheme will be concerned with the water communication from Birmingham to the sea, *viâ* the Severn. Both the Birmingham and Cardiff Corporations are willing to contribute to the cost if the State will give a lead; and the Gloucester City Council and others are prepared to go into the question at the proper time. The suggestion of the Royal Commission on Canals as to development between the Bristol Channel and Birmingham, involves the improvement of the Worcester and Birmingham Canal for a length of thirty miles, so that barges of 100 ton capacity can run. From Worcester to Gloucester, the Severn has already a capacity for boats even up to a larger size—200 tons. From Gloucester to Sharpness, the Worcester and Berkeley Canal will accommodate boats up to 1200 tons. However, these are indications that the report of the Royal

Commission has had a stimulating effect upon local intelligence and opinion, which has expanded into a desire in these two instances to gain the advantage of improved waterways. If something comes of the stimulation, the work of the Royal Commission will not have been lost; but we would much rather have seen the appointment of a Waterways Board as recommended, and the development of the waterways taken in hand in a methodical manner, instead of spasmodically, with schemes depending upon the willingness of a number of local authorities voluntarily to render support. Without Government legislation and support, and proper co-ordination of work, there cannot be very much hope of the thorough and full development of the waterways of the country, which would confer upon it inestimable benefits.

Reorganization at Dublin.

It is too early to be critical, and particularly hypercritical, over what is being done to set in order the affairs of the Alliance and Dublin Consumers' Gas Company; and the past half year is anything but a good one upon which to found fair judgment. At the meeting of the proprietors last week, there was good confidence displayed by the Chairman (Mr. John Murphy) and his colleagues as to the future—that is the future when things, other than the liquidation of the incalculable burden of costs of the war, have settled down to normal lines. We have no doubt that the confidence is well placed, always assuming that the policy now being pursued by the Board is an enduring one, although they have a terrible incubus in the shape of a capital which must act oppressively upon all their regenerating operations. Nevertheless, they are going the right way to work to lighten this drawback—a legacy of past administration—in the interests of the future.

Naturally, the plans of the Consulting Engineer (Mr. William Newbigging) and the Directors have been rather severely affected by the war. Prior to this, it was vital to the concern that its working should be placed on the most economical scale consistent with efficiency; there had not been efficiency, and so the working had not been economical. Under war conditions, the necessity for the ultimate possible economy has been largely increased; and for the Company it is a great pity the reforms which were well in hand prior to the war have been retarded by it. Through non-delivery of parts, the new coal-handling plant, for example, is not yet at work, but will soon be now. The method that has existed of transferring coal from wharf to retort-house and into store, was fatal to works' economy; and there is a good saving to be effected in this connection. A great improvement, which has been attended by "considerable economy," has been the transfer of the stove-repairing shop to a new site. Other work, too, has been carried out or has been planned. The fact of the existence of these seats of possible large economy shows the advantage of the crisis that was reached in the Company's affairs; for a continuation on the old lines could only have landed the concern into positive disaster.

In the past, capital has been overloaded by charges which it would have been better to place against revenue, as is now commonly done. This has received the attention of the Board, in conjunction with Mr. William Cash, F.C.A., and the new Secretary (Mr. W. J. Grey); and the allocation of charges has been adjusted. It is impossible in a short time to achieve perfect order from chaos; but we believe that what is being done will operate to strengthen greatly the financial condition of the Company. In paying a small dividend on this occasion—having in view the position of the concern, its dependability upon oversea supplies of coal with the heavy freightage ruling, and the impossibility of penetrating the future—the Directors are doing well not to run the Company's balances too close, while at the same time beginning to build-up a stronger financial state than has hitherto existed. It is a case in which it is better to go boldly forward than to linger while reformation is in the air, and while the work is in hand. The more comprehensive the initial work of reformation now, the better for the future.

A Strike Settlement.

Birkenhead has been somewhat in the public eye just lately, from various causes—one of them being a strike of gas workers. There have been just one or two occurrences of this character the industry has experienced since the war began; and of this, as of its predecessors, it must be said, if a strike could ever be justified in the case of men engaged on a gas-works, the present, at any rate, is not the time for endeavouring to gain personal ends by bringing about the cessation of a public supply of gas. The Birkenhead case was, as recorded elsewhere, referred to arbitration, and the inquiry was promptly undertaken and completed—the award granting the men varying increases in their rates of wages. The facts are that the men concerned were granted a war bonus, but this they considered insufficient, on the ground that an increase of wages had been very long under negotiation—a point on which the parties involved in the trouble differed. But however this may be, the fact remains that the town was put to considerable inconvenience by the strike; and in all probability the output of warlike material was affected—as certainly was the comfort of the military in the neighbourhood. This condition of affairs—gradually ameliorated by the strenuous efforts of volunteers and others in the works—lasted for more than a fortnight; and then the Council and the men's leaders agreed to act upon a suggestion made by Sir George Askwith, that the matter should be the subject of arbitration—the men meanwhile to be re-instated in their positions as rapidly as circumstances would admit. There is much evidence that the principle of arbitration is being effectively employed in these stressful days; but it is always more pleasing to see it brought into action before there is a stoppage of work than afterwards. That is to say, "prevention is better than cure." In the Press there have appeared unpleasant references to damage to the Birkenhead Gas-Works machinery, said to have been discovered after the employees ceased work; but, though repentance for the strike comes late, on the other side of the account may be placed the subsequent statement of the Union representative that the men were willing to return to work, pending a settlement by arbitration, in order "to avoid any further inconvenience to the ratepayers, and so that the manufacture of munitions of war might be hastened." It is to be hoped the new spirit will endure, and make the settlement a lasting one.

Gas Undertakings and the Rates.

Those municipalities, and there are many of them, who have been in the habit of relying to a substantial extent on the profits of their gas undertakings to assist in keeping the rates down to a level at which they would not remain if the principle of direct taxation were more rigorously applied, are feeling to an uncomfortable degree the present temporary "lean" period. At existing prices of gas, profits, where they can be made at all, are not likely to be of the same dimensions as they were in easier times; and if the contributions to the rates are to be maintained at previous levels, consumers must obviously provide more "profits." At West Bromwich, one member of the Council has chosen this moment to raise the point as to whether the gas and electricity undertakings ought not to come forward and render financial assistance to help keep down the rates. But the reply to this was the sound one that by selling gas at the lowest possible rate the undertaking was doing good service to the town. It will be noticed here that the old argument was made use of—"that the ratepayers found the capital to work the concern, and in return they ought to have some relief." If this has been the case at West Bromwich, it certainly is not so in the majority of instances; for generally it is to the gas consumers as such, and not to the ratepayers, that municipally-owned undertakings owe everything. At Halifax, where it has been the practice to contribute to the rates 1½ per cent. on the capital of the trading concerns, a substantial increase in the price of gas has been necessitated to maintain this for the coming year. When the budget was before the Council, one of the members remarked that the gas profits had been taken before they were actually made; and the putting-up of the price of gas so as to afford relief to the rates was not a fair incidence of taxation. The gist of the whole matter is to be found in this councillor's contention that some consumers use gas largely, and there is no reason why they should have to bear this fixed charge on the capital in order to relieve other ratepayers. The argument that none of the revenue-earning undertakings could begin to talk about "profit" till they had paid to the Council the 1½ per cent. claimed "as insurance," merely raises a point as to the proper meaning of words, and may be left at that.

Temporary Advantage of the Maximum Price.

Of course, electricity companies cannot avoid increased costs in these days, any more than can the gas companies. It is computed that higher coal and freight prices have raised the generating costs of certain concerns in the Metropolitan area by about 40 per cent., while payments in the shape of war bonuses have caused wages bills to go up by about 10 per cent. Nevertheless, a writer in "The Times" does not think the charges for electric current ought to be advanced; and for the reason that the gas companies, under the sliding-scale, have on an increase in the price of gas to forfeit a part of their dividend, while the electric companies, working under a maximum price, have not to do anything of the kind. Among the London Electric Supply Companies, two paid 10 per cent. dividend last year, three 9 per cent., one 7 per cent., three 5 per cent., one 4 per cent., and one 3½ per cent. When some of these dividends are compared with the statutory ones that gas companies are allowed to pay, the writer in our morning contemporary questions whether the electricity companies are entitled to burden their consumers with increased charges solely to maintain dividends. The point was raised in the London County Council last week, when it was suggested that one way of having the obligations of the electricity companies better defined would be by imposing the sliding-scale upon them, and so making the shareholders participate with the consumers in meeting increased costs in times of adversity, as gas shareholders do, and allowing them to enjoy in times of prosperity increased dividends upon the consumers obtaining a reduction of price. The Special Electricity Committee are going to look into the matter. But what can they do? The Companies are within their legal rights. Nothing but legislation could impose on them a sliding-scale; and with their strange medley of tariffs, we do not know how it would be possible to practically apply the system. It is easy enough to make comparison, which shows how hardly hit gas shareholders are owing to the necessity for an unparalleled increase in price; but how comfortably off, in contrast, are electric shareholders, who are not called upon to sacrifice anything in making their customers pay a further 10 per cent. upon their accounts. It is not so easy to show how the two classes of concern could be made co-equal in this direction, owing to the differences there are in their systems of doing business.

OBITUARY.

The death occurred last month, at his residence in Middlesbrough, of Mr. ROBERT FORD GLOAG, who was for many years the Managing-Director of Messrs. Sadler and Co., Limited.

Before beginning the business at the recent meeting of the Leamington Priors Gas Company, the Chairman (Dr. Thursfield) alluded to the death of the late Chairman (Mr. Edward Wright); and upon his proposal, seconded by Dr. Mason, the following resolution was passed: "That this meeting of proprietors of the Leamington Priors Gas Company receives with much sorrow the report of the death of the late Chairman, Mr. Edward Wright, and desires to record its appreciation of the able services which he rendered to the Company for fifty years. For twenty years he was Chairman of the Board of Directors, and the shareholders could never forget his courtesy and marked business capacity."

By the death of Mr. JOSEPH HAMMOND, at the age of 76, the Gas Department of the Coventry Corporation have lost a much-respected servant, who for more than fifty years had been actively identified with the local undertaking. He was originally in the employ of Messrs. Robinson Bros., the owners of the gas-works many years ago, and afterwards served with the Coventry Gas Company, subsequently becoming a member of the staff of the Gas Department. He was chief inspector of gas stoves and meters. On his retirement a few years ago, on account of failing health, he was presented by his colleagues with a very acceptable gift; and the celebration of his Golden Wedding six years ago was also made the occasion of an interesting presentation.

Messrs. Galloways, Limited, of Manchester, have just cast the first of four bed-plates for the large gas blowing-engines which they have on order for Palmer's Shipbuilding and Iron Company, Limited. This is an event of interest to local engineering firms on account of the exceptional magnitude of the casting, and also because, in the past, practically the whole of this class of gas-engine work has been carried out by German engineering firms. The casting, which necessitated the pouring of upwards of 50 tons of molten iron, is the largest single casting that Galloways have ever made.

PERSONAL.

Mr. G. DUNCAN, who has been delivering a course of lectures in Perth, on gas manufacture and distribution, has been presented by the employees at the gas-works with a handsome rose-bowl and a set of books on gas engineering. The presentation was made by Mr. David Vass, the Gas Engineer and Manager.

Mr. JAMES BIRD, the Deputy-Clerk to the London County Council, has been raised to the position of Clerk, rendered vacant by the retirement of Sir Laurence Gomme. Mr. Bird has been in the permanent service of the Council and their predecessors since 1881, when he was appointed in the fourth class; and he was made Deputy-Clerk in 1905. He is fifty-two years of age.

Mr. JOHN FURNISS, the Secretary and Manager of the Slaithwaite Gas Company, has been appointed a Magistrate for the West Riding. Mr. Furniss, who is a native of Brighouse, entered the gas industry at the age of fourteen as apprentice to the Gas Manager at Brighouse, and took up his present appointment in 1878. When he became Manager at Slaithwaite, the price of gas was 5s. 6d. per 1000 cubic feet, and the total manufacture 8 million cubic feet per annum. Now the price is 2s. 11d., and the production 60 millions per annum. Mr. Furniss has long been actively identified with the public life of the district. He has been a member of the Slaithwaite District Council since 1894, has been Chairman four times, and has been closely connected with local hospital control and education matters.

The Late Mr. William Langford.

The funeral of Mr. William Langford, whose death was recorded in the "JOURNAL" last week, took place on the 30th ult., at the Longton Cemetery, amid many manifestations of sympathy and regret. Prior to the interment a memorial service was held at Stafford Street Wesleyan Church, Longton, in connection with which deceased had held many offices. The Mayor (Alderman Philip Elliott) and members of the Stoke-upon-Trent Corporation, as well as the chief officials, assembled at the church and accompanied the procession to the cemetery. One of the coaches was occupied by the Chairman (Alderman T. Mitchell) and the Vice-Chairman (Mr. J. Shenton) of the Gas Committee, and Mr. R. Surtees, of Burslem. The following engineers and managers of gas-works attended: Messrs. J. E. Blundell (Macclesfield), T. W. Saville (Stone), F. L. Wimhurst (Newcastle-under-Lyme), E. A. Harman (representing the Manchester District Institution of Gas Engineers), C. Loveridge (Wolstanton), J. T. Broughton (Congleton), H. E. Copp and J. Warrilow (British Gas Light Company), and H. Haddock (Atherstone). Several representatives of firms connected with the gas industry attended to testify their personal regard for the deceased; and members of the Etruscan Lodge (of which he was a Past-Master) and Chapter were also present. Mr. Langford was in his sixty-first year; and he leaves a widow and three sons, Messrs. L. J., P. N., and C. G. Langford. The first is Gas Manager to the Abertillery District Council, and the last is Manager of the Pará Gas Company.

"Transactions" of the Institution of Water Engineers.—We have received Vol. XIX. of the "Transactions" of the Institution, containing the reports of the summer and winter meetings held last year under the presidency of Mr. Thomas Molyneux, Assoc.M.Inst.C.E., the Water Engineer of the Stockport Corporation. The proceedings at the two meetings were noticed in the "JOURNAL" at the time; but the papers are fully illustrated in the volume under notice. An account is given of the visit of the members to the Kinder Water-Works of the Corporation, a description of which was furnished by the President in the form of a paper. In addition to the technical matter, summaries of the contents and indexes to the subjects in all the volumes are given. The list of the Council, Officers, and Past-Presidents, and a statement of the accounts for the year, make up the contents. As usual, a portrait of the President serves as a frontispiece. The volume has been edited by Mr. Percy Griffith, M.Inst.C.E., F.G.S., the Secretary of the Institution.

Extracting Products from Gas Liquor.—In the "JOURNAL" for the 18th of August last (p. 392), we gave an abstract translation of the specification of a patent taken out for France by MM. Louis Charles Bonneau and Victor Emile Hasenfratz, for a process for the extraction of the products contained in gas liquor. The patentees have made an addition to it; and the following indication of its nature is given in the number of the "Journal of the Society of Chemical Industry" for the 31st ult.: Sulphur is extracted in a digester, fed with the boiling solvent and communicating by a syphon with a distilling apparatus in which the dissolved sulphur is recovered; the condensed solvent being returned continuously to the digester. When the material is exhausted, it is transferred with water to a vessel fitted with a stirrer, in which adhering solvent is recovered by heat, and distillation with lime commenced; and from this vessel the mixture is pumped into a column for the complete removal of ammonia. The solution is then led through settling-vats, treated with potassium chloride, and the precipitated calcium-potassium ferrocyanide boiled with sodium carbonate and filtered. The filtrate is treated with ferrous sulphate, and the resulting precipitate oxidized to prussian blue, which is washed and dried.

GAUGING OF GASHOLDER SHEETS AND PLATES.

A Criticism and a Reply.

In the "Ironmonger" recently, there appeared the following criticism on the addition to the standard clauses of contract of one dealing with the gauging of gasholder sheets and plates:

The report of the Society of British Gas Industries presented at the annual meeting furnishes some information respecting a conference which was held during 1914 between the Institution of Gas Engineers and a Committee of the Society with reference to the gauging of gasholder sheets and plates, and also the rolling margin to be allowed. We gather from the report that the Council considers the result satisfactory, and likely to remove a long-felt hardship under some specifications. A new clause based on the agreement is to be embodied in the standard clauses of contract. From it we quote the following:

XXX.—Gauging of Gasholder Sheets and Plates.

That the recommendations of the Engineering Standards Committee be recognized.

That the standard wire gauge be employed. (S.W.G.)

With regard to sheets ¼ inch thick and under, where a thickness or weight is specified there shall be a rolling margin in the thickness or weight of 5 per cent. under and over.

There are two other provisions; but the foregoing is sufficient to justify our pointing out that within six months of the Birmingham gauge (B.G.) becoming the legalized denomination of standard for sheets, two important bodies like the Institution of Gas Engineers and the Society of British Gas Industries have passed it over, and adopted the imperial standard wire gauge (S.W.G.) for sheet measurements. This is a matter which seems to call for some explanation; and it is certainly extraordinary that nobody at the general meeting of the Society protested against the absurdity of adopting the wire gauge just when a gauge for sheet iron has, after a great deal of trouble, attained the dignity of legal recognition. It is a fair inference that the sheet makers were not represented at the conference, and that the decision of the two Councils was reached without consultation even with them, for the negotiations which culminated in the Order in Council of November last were begun in 1911. The parties to this agreement expect that it will remove "a long-felt hardship under some specifications." What that hardship may have been is not stated; but the most probable result of the new clause will be a fresh crop of misunderstandings between the gas engineers, the manufacturers of plant, and the sheet mills.

We called the attention of Mr. J. W. Broadhead, the late Chairman of the Council of the Society of British Gas Industries, to the criticism; and he replies as follows:

Rose Mount Iron-Works, Elland, April 3, 1915.

Dear Sir,—I am obliged to you for, as late Chairman of the Society of British Gas Industries, drawing my attention to the article in the "Ironmonger" dealing with a new clause which, during my year of office, was added to the standard clauses of contract.

Neither gas engineers nor gasholder makers (who, after all, specify and order the thickness and sheets they require) appear to have been aware that negotiations were proceeding between rolling-mills and the Board of Trade with regard to a standard gauge, nor have they, as a body, been consulted in the matter. As a matter of fact, only few of our members seem to have been aware that the Birmingham gauge has become a legalized standard; and, from inquiries I have made, very few of us appear to have received a circular on the subject issued by His Majesty's Privy Council.

It is a gauge, generally speaking, which has not been used by gas engineers; in all my experience I have only come across it in the specifications of one engineer.

The gauges used by gas engineers and gasholder builders were the Birmingham wire gauge and the standard wire gauge, both of which are heavier than the Birmingham gauge; and it was felt by both parties that it would be an advantage to discard one of these two, and the standard wire gauge was adopted in the new clause.

The removal of the "long felt hardship" referred to is not the selection of a gauge, but the adoption of an engineering standard, and the new additional clause dealing with the rolling margins.—Yours faithfully,

(Signed) J. W. Broadhead.

Commercial Gas Company's Increased Price.

The Directors of the Commercial Gas Company regret to give notice that, owing to the large rise in the cost of coal and other raw materials, and the extra payments to the Company's workmen by reason of the war, the price of gas will be raised 4d. per 1000 cubic feet from the taking of the meter-indices at the Lady-day quarter. The price of gas supplied through penny-in-the-slot meters will be raised from 3s. 2d. to 3s. 6d. per 1000 cubic feet; and the meters will be adjusted to consume 24 feet of gas for 1d. It is pointed out in the official intimation that, in accordance with the Company's Acts of Parliament, this advance in price involves a corresponding reduction in the dividend payable to the shareholders.

THE GAS INDUSTRY AND THE WAR.

It is reported that an effort is being made to get the Treasury to remove their interdict against capital expenditure by municipalities so far as to allow the Manchester Corporation to proceed with the erection of a new electricity generating station at Barton. As the scheme was planned, the first portion of the works, which will cost £135,350, was to have been completed by March of next year. The Electricity Committee contend that it is in the public interest that the work should proceed. They have been encouraged by the Central Executive Committee of the Employers' Parliamentary Association, who, meeting in Manchester, under the chairmanship of Sir Charles Macara, expressed the opinion that "permission should be accorded to the Manchester Corporation and other corporations similarly situated, by His Majesty's Treasury, to raise fresh loans for the purpose of the extension of any electricity undertakings, as refusal to secure permission would hamper, to a very considerable extent, those firms engaged on Government contracts who are dependent upon the Corporation for their supplies of motive power."

Mr. J. Richard Milne, of Messrs. James Milne and Son, Limited, who has held a commission for the last six years in the Forth Royal Garrison Artillery, has just been gazetted to a Captaincy in that Corps. Captain Milne has also recently been appointed Adjutant, and is carrying on the duties, which are usually performed by a regular officer of the Royal Garrison Artillery.

Mr. H. Townsend, jun., Assistant Engineer and Manager of the Wakefield Gas Company, who rejoined the 4th Battalion King's Own Yorkshire Light Infantry Regiment (Territorials) at the beginning of the war, has been given a Commission in the 11th Battalion of the same regiment.

The Mayor of Chester (Alderman J. M. Frost, J.P.), who is also Chairman of the Chester United Gas Company, on Wednesday night received news that his son, Captain T. L. Frost, of the 1st Battalion Cheshire Regiment, was killed in action on Monday. Captain Frost, who is one of the Mayor's three soldier sons, participated in the retreat from Mons, and was mentioned in despatches. He had been acting as Adjutant to the 1st Battalion of the Cheshires.

On Saturday, the 27th ult., Sir Hallewell Rogers (the Chairman of the Birmingham Gas Committee) visited Chelmsford to inspect the Third South Midland Brigade R.F.A., of which he is Honorary Colonel, prior to their departure on foreign service. All the men seemed thoroughly trained and in excellent spirits. Great disappointment was expressed, however, by both officers and men, at the fact that Colonel Saunders, who has trained the brigade, was unable to go abroad with them; the Medical Board refusing to pass him on account of eyesight. Sir Hallewell took the opportunity of addressing a few encouraging words to the men of "A" Battery, under Major Ward's command. This battery is composed almost entirely of Birmingham men, many of them former employees of the Gas Department.

The response to the circular recently issued by British Dyes, Limited, had last Thursday produced new subscriptions to the extent of £156,000, including those previously made subject to special conditions. Applications beyond this total were still to come in. The Directors therefore decided that they would go to allotment.

At a company meeting in Birmingham last week, Sir Thomas Barclay referred to the necessity for the establishment of a national research laboratory, and outlined a scheme to this end. He said that, in his opinion, there should be established a research laboratory separate from the laboratories in the country, which might be called a "Central State Research Laboratory." In the existing universities there should be courses of three to four years, leading to an honours degree, with a post-graduate course of one year, in the methods of research; and such students only should be eligible for nomination by their professors for scholarships in the Central State Research Laboratory. Nominated and approved students would pass with scholarships to the State Research Laboratory, where they would work under the control of a board representing professors and business men upon the problems of synthetic chemistry, including not only aniline dyes, but also the production of those chemicals which were either already used, or would be likely to be of value, in medicine. In correlation with this research laboratory would be the chemical works of the country, employing the trained research workers and utilizing the patented processes evolved in the laboratory under royalty payable to the Government. The scholarships might be of the value of £150 per annum; and any particularly valuable discoveries made would not be remunerated to the worker by the Government, but by the enhanced value of such worker to manufacturers. It would be necessary to have connected with the research laboratory a works laboratory which should be equipped for proving processes on a scale large enough for commercial tests. When this was done, and it was found that the process was right for commercial purposes, it would be the business of the Board of Trade to patent the processes and offer them to all manufacturers in the country who chose to work them on royalty.

The research students would be "enthused" with the idea of turning their attention to practical research, so as not only to obtain the kudos which such a discovery would give them, but to secure good appointments and the financial results which would fairly belong to them. The successful students would, no doubt, be in great demand by manufacturers, who would desire to obtain their services to carry out the process of manufacture under various patents, to the advantage of the technical industries of the country.

Our "War Notes" have testified from time to time to the troubles experienced by those who are responsible for keeping up the supply of gas and water in towns in or near which hostilities are being carried on; and it may be remembered that at the meeting of the Institution of Water Engineers in December last, Dr. Ad. Kemna, of Antwerp, in a letter to the Secretary, acknowledged the sympathy of the members which had been conveyed to him in his trying circumstances. He told them that the Waelhem works of the Antwerp Water Company had been systematically bombarded. Further particulars as to the Company's position are available from the report which the Directors presented at the annual meeting last Wednesday. They expressed regret that the only balance-sheet they could submit to the shareholders was such as could be compiled from the figures in the London books. Owing to the outbreak of war, the Auditors were unable to visit Antwerp for the half-yearly audit, and therefore no profit and loss account could be prepared. After the damage to the main pumping-station at Waelhem, the supply was continued by means of an emergency installation at the docks until the bombardment took place, when all the staff left the city. After some few days the town authorities, at the special request of the German military authorities, recommended a partial supply—carrying out, under the direction of the City Engineer, such repairs to the works as were immediately possible, at the Company's expense; and these have been sufficient to enable the supply to the city to be maintained up to the present time. In considering the position of the Company, the Board first took Counsel's opinion, and applied to the Foreign Office and also to the Belgian Government for direction. Pending a reply from the latter, the Foreign Office wrote on the 24th of December, advising the Company to adopt, for the moment, a passive attitude. On the 26th, however, the Belgian Government wrote that there was nothing in the situation at Antwerp to relieve the Company from their legal obligations to continue the supply; and a confirmation of this decision was received through the Foreign Office on Dec. 30. The Manager therefore returned to Antwerp and resumed his duties on the 6th of January; most of the staff having meanwhile gone back, with the exception of the English employees. No direct communication can be had with Antwerp; and it has been impossible to remit money to London.

Regarding the actual damage to the water-works at Antwerp (referred to in the preceding paragraph), Mr. George Evans, in his address to the shareholders, said he was glad to mention that, though very considerable, it was less than they at first feared. It was practically confined to Waelham. Notmeir suffered but little; and Laythagen escaped entirely. The offices in the city were untouched; but he was sorry to say the house of their Manager, Mr. Van der Taelens, was completely wrecked and looted. The house of Mr. Burghardt, the Resident Engineer at Waelham, was also destroyed, and everything taken away. He himself had a very narrow escape. He returned the day the first shells fell near the works, to try to restart the pumps. Numerous shells—estimated at about 500—fell on the works; and Mr. Burghardt and the few men with him had to fly, and were lucky to get away unhurt. A provisional estimate of the damage had been made; and the total was said to be under £20,000—say, about £18,000. This total, he believed, included the cost of laying a temporary supply from the docks, and also a certain amount for loss of revenue in October, so the total loss on buildings and plant was estimated to be something about £13,000, which, he thought, considering all things—if this was the extent—meant that they had got off fairly cheap. Since the Manager's return, the Directors had heard indirectly that about 10,000 cubic metres of water were being pumped daily, which was equal to rather less than two-fifths of the normal quantity. Water-rentals were being collected on a reduced scale; and the working was carried on under supervision. Inevitably, it would take some time before the revenue reached the old figures.

In view of the reduced lighting, the Gas Company have offered the Cheshunt Urban District Council an allowance of 6d. per 1000 cubic feet for such quantity of gas, amounting to 1,303,000 cubic feet, as has not been consumed during the quarter ended December last. Reporting upon the offer at a meeting of the District Council, the Surveyor said that the position taken up by the Gas Company was that the reduced consumption had not enabled them to effect any reduction of expenditure on their standing working charges, as they were the same for the quantity of gas which had been made as they would have been if the lighting had been carried out as usual. The further consideration of the matter was adjourned, to enable the Surveyor to write to some other authorities who, it was stated, had agreed to accept the same allowances as those offered by the Gas Company.

RETAIL COAL PRICES.

Committee's Report.

THERE was appointed by the Board of Trade, at the end of February, a Committee consisting of six members (with Mr. Vaughan Nash, C.V.O., C.B., as Chairman), to inquire into the causes of the rise in the retail price of coal sold for domestic use, more especially to the poorer classes of consumers in London and other centres; and two other members were subsequently added to the number. After having held fifteen meetings, and, in addition to obtaining information from other sources, heard evidence from over thirty witnesses, the Committee have just issued their report. The witnesses, it should be mentioned, included representatives of the Government departments concerned, the gas companies, the railway companies, London coal merchants and trolley trade, colliery owners, and co-operative societies. With some exceptions, it seems, the North and the Midlands have not suffered from any very remarkable rise in the price of household coal; while in the Southern counties, apart from the additional charges due to the railway rates on a longer journey, prices are governed so largely by London conditions that the Committee considered it unnecessary to deal with them separately.

The Committee open their report by pointing out that the inquiry has been conducted under considerable difficulty. Exigencies of time prevented the definite and precise settlement of some important questions; and so in various respects reliance had to be placed on estimates given by witnesses from their personal experience. However, it is not thought that any corrections in particular figures which might be made if the results of statistical inquiry were available would materially affect the broad general conclusions which have been reached. Prices and dates set forth in the report show that, as between June, 1914, and February, 1915, the rise was 9s. per ton for good coal, and 14s. per ton for the cheapest quality; the increase above normal winter prices being 7s. and 11s. respectively. As for "trolley prices" of small quantities of coal, the rise in price of a high-class coal between November and February is given as at the rate of 11s. 8d. per ton. In the opinion of the Committee, the initial cause of the increase of prices recently was a deficiency of supply as compared with demand—and in particular a deficiency of supply in London. The high prices of household coal are, they conclude, not attributable to the existence of definitely constituted "rings" or close corporations among either coal merchants or colliery owners; but, "as in some other trades, there are evidently opportunities of conference among those chiefly concerned which do in effect commonly lead to concerted action with respect to prices."

As to the causes of the deficiencies of supply, the reduction of output, due mainly to the large number of miners who joined the Colours, is, of course, placed first. Then, during November and December the scarcity of shipping, and consequent rise of freights, began to cut off the supply of sea-borne coal. It is pointed out that comparatively little household coal comes to London by sea; but the result of the reduction in the sea-borne supply of, for instance, gas coal was that it was largely thrown on the railways, which at the same time were congested owing to military requirements. London has, too, some peculiarities. Generally collieries prefer to rely, if possible, on the nearest big town or towns; and when the local market has absorbed all it can, the surplus is sent to London. When, therefore, supplies are deficient, London has to make high bids in order to attract coal from the local market. Another peculiarity of London is its lack of storage accommodation. Difficulties of distribution are not, on the whole, regarded as a serious contributory cause of prevailing high prices. The Committee think it is due to the railway companies to say that they are now, under difficult circumstances, bringing regular and increased supplies of coal to the London market. Returns submitted go to show that the daily arrivals of rail-borne coal are equal to the usual supplies available at this time of year; and, further, the employment in the sea-borne trade of the interned steamers has sensibly relieved the pressure on the railways. At certain periods, the demand in London has, it seems, been, if not greater than usual, at least greater than it need have been, by reason of "panic" orders.

Making a calculation, the Committee arrive at the conclusion that the total rise in the cost of production and distribution of coal has been at most 3s. per ton; so that the sums recently paid, and now being paid, for coal by London consumers include a large surplus above ordinary profits, after making full allowance for this extra cost. The impression left upon their minds by the evidence and information before them is that the conduct of such an important industry cannot safely be left, in a time of crisis, to the working of an unregulated system of supply and demand; and the situation as regards prices relatively to supplies should be closely and continuously watched, with the aid of the returns now being periodically received by the Board of Trade from the colliery owners and the coal merchants. As to remedies, it is remarked that, unless action is taken promptly, the large contracts for a year's supply, which are usually made between April and June, will be at a considerably higher range of prices than last year; and these contracts will form the basis of prices to the consumer in London during next winter. "In spite, therefore," they say, "of the relief which may shortly be expected, the outlook for the winter of 1915-16 is serious, and requires immediate consideration."

The Committee's recommendations are set out at some length

in the report; but it will be sufficient here to give their own summary of them.

1.—Exports to neutral countries should be restricted.

2.—Steps should at once be taken to consider, in consultation with the public bodies concerned, the question of the accumulation by such bodies of reserves of coal in or near London, for the use of small consumers next winter.

3.—The rates of freight on the interned steamers should be further reduced.

4.—Suitable enemy ships condemned by the Prize Court should be taken over by the Government and used for coal transport.

5.—If prices do not shortly return to a reasonable level, the Government should consider a scheme for assuming control of the output of collieries during the continuance of the war.

References to Gas Coal.

The opinion is expressed by the Committee that for purposes of regulation and control it is impracticable to draw a hard-and-fast line between household and gas and industrial coal; so that any action affecting the price or distribution of household coal would have an immediate effect upon other coal, which is often drawn from the same pits, is selling at the same enhanced price, and is obtained, they understand, with even greater difficulty than coal used for domestic purposes. Therefore only by measures taking account of the coal industry as a whole can relief be brought to the domestic consumer.

In explanation of the recommendations that the rates of freight on the interned steamers should be further reduced, and that other suitable condemned enemy ships should be taken over by the Government and used for coal transport, the Committee point out that a cheap supply of gas is of the greatest importance to the poorer classes of consumers, and 1s. per ton on the coal means 1d. per 1000 cubic feet in the price of gas. "The Gas Light and Coke Company," they remark, "alone supply a population of perhaps 3,500,000. The consumers served by this Company use 500,000 automatic meters; and the consumers obtaining gas by these meters use 400,000 gas-stoves. The addition of 1d. per 1000 feet to the price of gas involves an additional charge of £110,000 per annum to the consumers in North London alone, and of over £200,000 per annum through all London." Attention is drawn to the increases in price of the Gas Light and Coke and South Metropolitan Companies, which have been necessitated by the very high rates of freight for gas coal from the North; and the point is made that these high freights may also lead contractors to bring gas coal south by railway, thereby reducing the usual facilities for the transport of household coal. The interned ships now occupied in transporting coal for public utility companies in London are, the Committee are informed, employed, so far as practicable, at rates tending to reduce the high freights now charged, "which during recent months have stood at 10s. a ton or more above the normal rates;" and they suggest that this policy should be extended in the direction of lowering the rates of freight on these steamers. They add that it would, of course, be advisable to ensure that the benefit of low freights on the coal brought by such steamers should go to the consumers; and they "understand that this object is already attained to a considerable degree in the case of coal required for making gas in London." The proposal put forward by the Committee is that the London Coal Advisory Committee should be asked to draw up, for the consideration of the Board of Trade, a detailed scheme for ensuring that the benefit of the cheap carriage suggested should go to the public.

Gas-Works and the Production of Explosives.

One of the "Annotations" in the "Lancet" last Saturday was on the subject of "The Air as a Source of Explosives." The writer expressed the opinion that the demand recently credited to Sir John French, "Munition, more munition, always more munition," might well have been "Nitrogen, more nitrogen, always more nitrogen," for, he pointed out, without nitrogen the most distinctive form of modern munition—viz., the high explosive—cannot be made. He went on to say that if the issue of war is to depend upon explosives, that nation will win who succeeds in utilizing the greatest supply of nitrogen. Should the nitrogen of the air become economically available for the purpose, all nations will be equally well off as regards the supply of raw material. The important question remains, however, as to whether all nations will be equally well situated concerning the means of converting this abundant supply into nitric agents. It is only economic power that can do this for practical purposes; and, so far, water power is the cheapest. Assuming that no cheaper method of production than by water power converted into electric energy is available, and assuming again that equally effective explosives of a non-nitric type are not invented, the writer says "this conclusion affords a suggestive perspective when the countries which possess great natural water powers and great gas-works are remembered. Nitric acid requires partners; and the most effective are those produced at gas-works. As far as we know, carbolic acid and toluene are produced nowhere else in practical quantities; so that the gas industry assumes an importance equal to the great water-power stations when the production of explosives is considered." We may suggest that the writer ought not to overlook the coking industry.

ELECTRICITY SUPPLY MEMORANDA.

An "Engineering Correspondent" of the "Engineering Supplement" of "The Times" suffers from excessive simplicity. We like to see simplicity in its proper place, but not when treating of commercial matters. This "Engineering Correspondent" sees a fine opportunity for the electricity industry in the present circumstance of dear coal; and he thinks the central station engineer should now throw himself vigorously into the cause of developing the use of electricity for heating and cooking. He says (and we agree it is a fact) that upward movements in the price of fuel have less effect on the generating costs of electricity than upon the manufacturing costs of gas; but at the same time, the margin between average income and expenditure per unit is dwindling, owing to higher costs, to increased use of low-priced units, and to diminished consumption of the heavier-priced units. So it is inevitable that in many—we might say most—places, the price of current will have to be raised. This is one point against the recommended vigorous attack, which recommendation suggests that central station engineers are extraordinarily somnolent in commercial matters. As to the directions in which the vigorous onslaught should be made—heating and cooking—householders are now faced with the necessity of economizing; expenses for them are going up all round. Most of them in the classes within the field of electrical operations have recently been paying their income-tax; and the more fortunate ones have had dividend warrants showing diminutions in amount due to heavier costs of working, and the high income-tax on "unearned" income. Spring, too, is approaching; and thoughts, instead of turning to electric-radiators (the heat from which requires supplementing by other sources during the coldest days), will be drifting to the balmier days when coal can be largely dispensed with in the household. And as to cooking, the "Engineering Correspondent" should read up the discussion on the subject at the recent meeting of the Institution of Electrical Engineers. There he will find something about cooker breakdowns, additional expenses for repairs, and genuine advice not to be so callous as to let consumers down without warning them that the "advantages" of electric cooking are mitigated by certain disadvantages. There is still further evidence of sweet simplicity and limited knowledge. The "Engineering Correspondent" says that the substitution of electric radiators and cookers will actually release labour, and tend to the more efficient employment and mobilization of the country's workers. He has his eyes on the coalheavers. They will be largely set free by spring; and as far as reduction of labour in the household is concerned—well, gas is already there. One other drawback to the proposed vigorous onslaught is the impregnable barrier to additional capital expenditure erected by the Treasury and the Local Government Board, excepting where Government work is menaced. If new connections cannot be fed from the existing plant, then they are not to be made. Moreover, loans cannot now be obtained at the same rates of interest as before the war.

The Electrical Man's Opportunity.

Maintaining the "Status Quo."

There are not many electricity undertakings outside those with exceptionally good areas that have made provision for "rainy days," and especially such days of storm and stress as these. Depreciation funds have been very commonly sneered at in the case of municipal ventures; the argument having been that the sinking fund payments were the equivalent of depreciation. Such funds would have been very useful now. Some undertakings blessed with the most lucrative areas have put by reserve funds; and it is proposed that these shall be utilized, in the absence of capital authorization, for the purpose of developing business where the generating plants are large enough to bear new custom. But it would be rather foolish policy to deplete these funds right at the beginning of the capital expenditure restrictions, seeing that the Treasury veto is going to extend not only during the war but for twelve months after. Resources should therefore be husbanded. There is just the danger, too, now that summer is approaching, of making the mistake of taking on new consumers, and then when the winter load comes on of not being able to meet the demand. One cannot rely upon consumers generously reducing their demands at times of peak-load. Looking down the news items in our electrical contemporaries week after week, it is rather curious to notice how many municipal electricity supply concerns have suddenly awakened to the fact that they require extensions of plant, and, despite the promulgation of the Treasury's views and regulations, are persisting in making application for loans, and thus throwing more work on the Government departments. Others are sensibly cutting-down their proposals to what is considered to be bare necessity. Even these, however, cannot be very hopeful, unless they can show a definite disadvantage, through the want of extra outlay, to factories employed on Government contracts or war requirements. A loan has been refused at Tunbridge Wells—this being entirely a residential area. Coventry, on the other hand, has obtained such money authorization as is necessary to supplement the supply of energy to establishments busy on war material and equipment. Other factories must be content with what they have. But there are many rueful electrical countenances where schemes

are in hand, and are partly completed. In these cases, there is warning that orders for plant that have not been given out must be withheld. And a very proper thing, too, in the circumstance of the unknown need of the nation for the war. It is merely a question of maintaining the *status quo* of business, where capital outlay can be postponed.

Cooking Notes.

Mr. W. R. Cooper cannot be charged with lack of courage. After the discussion on the paper he read at a London meeting of the Institution of Electrical Engineers, on personal experiences with electric cooking, he appeared before the Birmingham section of the Institution, and heard much the same criticism of certain features of the communication and the same support of others [see the "Memoranda" for the past two weeks]. The itinerant "Tricity" Grogan was there, and repeated the views expressed in London. Grogan and the "Tricity" cooker are inseparables; and when Grogan gets up at a meeting, well "Tricity" is advertised by his mere presence, without mentioning the name of the cooker. The Institution of Electrical Engineers' meetings therefore seem to be regarded as offering a good field for the advertising of this particular make of cooker. There was an attempt to again sit upon Mr. Cooper. He was told that his results were not representative, that certain things were absurd and even comical, that his cooker was too large, and that the consumption of current was high—judgment being passed without taking into account the diversity of cooking operations in different houses. Mr. C. Owen-Silver produced some results obtained at a hotel in the Midlands during fifteen months of electrical working. The price of gas was 2s. 6d. Electricity was supplied at 0·5d. per unit, *plus* a fixed charge of £8 per kilowatt demand, with a diversity factor. Some of the gas apparatus was replaced by electric, and some electric-fires were added. The costs during the past three years (the last being electric working under the new tariff) were:

	1912.	1913.	1914.
Coal	£35 10 2	£26 16 1	£35 5 0
Gas	47 12 2	53 0 10	13 0 2
Electricity . .	27 15 2	32 0 2	66 13 3
Total .	£110 17 6	£111 17 1	£114 18 5

We fail to see that these mixed-up figures prove anything, save that the hotel proprietor spent last year, when probably business was not so good as in the two preceding years, £3 or £4 more. However, most of the speakers fullly corroborated Mr. Cooper's views as to the absolute necessity of earthing all domestic electric apparatus; and flexible wiring received due condemnation. Speaking of wiring, it will be remembered that during the London discussion much ridicule was cast on the amount of the cost of the wiring of Mr. Cooper's installation. At Birmingham he mentioned that the work was carried out by the local electricity supply undertaking! Another speaker agreed with Mr. Cooper and with other men who spoke in London, that shrinkage savings of meat had been made too much of by some electrical advocates. There were also indications in the remarks as to the continued unreliability of electric-cookers; while another speaker said there was much about the electrical mode that appealed to the "feminine" mind. The reference to the "Tricity" cooker in this paragraph recalls that, at a recent meeting of the British Electric Transformer Company, the Chairman (Mr. A. F. Berry) stated that the development of their heater and "Tricity" cooker business in 1914 compared very well with that of 1913, though in this direction they had not had such a large turnover.

Electric Boiling-Disc Failures.

It will be remembered that during the discussion on Mr. Cooper's paper in London, electrical methods of water heating were almost universally condemned, and heating by coke-boilers was advocated. Mr. H. Purle has written to the "Electrical Times" on the subject. He says that many speakers in the discussion were of opinion that hot-plates are too liable to break-down to be included under maintenance charges. Is this, he asks, to be wondered at? It seems absurd to raise a mass of metal and insulator to a temperature approaching 800° C. in order to boil water or other liquid. If more attention were devoted to the manufacture of self-contained heater saucepans, &c., he does not think there would be so many breakdowns. It is quite possible with such apparatus for the heater temperature to keep as low as 300° C., while a much greater loading is possible—50 watts per square inch as against 22 for hot-plates. At such a temperature the chance of failure due to fusion or internal shorts, he believes, is very small. "At the same time a much higher speed of heating is obtained, combined with an efficiency of 90 per cent. or more." Mr. Purle also states that he has not had a happy experience of coke-boilers. The discussion at the London meeting of the Institution of Electrical Engineers shows that other people have; and they are not the only ones.

Wheels Within Wheels.

We were recently calling attention to the advantages that municipal electricity concerns possess in competition with private gas enterprise, as well as, being the younger and pampered child, in competition with gas supply also under municipal management. The advantage is disclosing itself in, among other ways, the prominent opportunities that are being accorded electricity concerns for demonstrating electric cooking—electric cooking under the expert protection of the electricity supply department, who keep watch and ward over it, in order that what is intended as advertisement may not bring forth ridicule. At Bradford we see the Corporation Kursaal has been electrically equipped; and apparently the electric apparatus has been provided by the Brompton and Kensington Accessories Company, who lately scrapped the electrical equipment in their restaurant for the double reason that it did not come up to their expectation, and was too large for the demand made upon it. It was recently stated, too, that electricity for cooking purposes had been introduced into the higher elementary schools at Newport (Mon.); and since it has been announced that the Electrical Engineer has induced the Technical Institute Committee to adopt electric cooking in connection with the new cookery instruction department for ladies.

Ingratitude.

The lighting of the Lewisham Infirmary comes up again. It was a matter over which there was quite lively interest in 1912-13, owing to the manner in which the South Metropolitan Gas Company made the Electricity Supply Company climb-down with their prices. Sorry as we were that the Gas Company unfairly lost the contract, owing to the Electric Company's action, and a desire on the part of certain members of the Board of Guardians to give the latter Company their patronage, the proceedings were not without their humorous side in watching the struggles of the electric people to succeed against the Gas Company. Even the Guardians who then favoured the Electricity Company, dared not support them unless they could match the Gas Company in price. Now we are reminded of the struggle in which the Electric Company secured the contract, but did not issue with honours. At a meeting of the Guardians the other day, it was stated with some elation—a "see-what-a-good-boy-I-am" sort of elation—that while the cost of gas and electricity in 1911 was £1182 17s. 8d., for 1914 (the first full year after the introduction of electricity) the cost was £744 8s. 8d. But to this had to be added £216 17s. 6d. on account of the loan incurred in installing the electric light. One offer of the Gas Company was to provide inverted gas-fittings for £400, which sum would have been discharged by two years' payments of the electricity loan charge. However, the two sums make a total charge of £962, as against £1182 in 1911. Last half year the outside lighting was reduced, so that there was some advantage to electricity. But is the comparison a fair one? The charge for gas lighting in 1911 with old upright burners is not the one for which the Gas Company offered to light the buildings with the economy-producing inverted gas-burners. This is the first figure with which contrast should be made. There is no statement, too, as to whether with electricity the Guardians have an equal amount of light as they would have obtained with inverted burners. Certain it is they are not getting the same quality of light. The second contrast that should be made is to ascertain what would have been the cost for electricity had not the Gas Company made another offer, in view of the predilection that they found among the Guardians in favour of electric lighting. The Electric Lighting Company's offer in 1913 was 3½d. per unit for lighting; but disconcerted over the Gas Company's demonstration and prices, they dropped down to 3d. Then the Gas Company offered a private gas-driven electricity generating plant, and guaranteed energy for lighting at 2d. per unit and 1½d. for power, including *all costs*—capital and everything else. The poor harassed and hard-pressed Electric Company dropped their prices with a run to 2d. and 1½d. This drop was a real win for the Gas Company. Among the comments we made at the time was this: "Either at 3d. per unit for lighting, the Electricity Company were proposing to take from the ratepayers more than they were justly entitled to, or else the prices quoted by the Gas Company are not profitable to the Electricity Company." A drop from 3½d. to 2d. per unit for lighting is rather a serious matter; and it told a good tale in this instance. The Guardians should now remember what might have been had it not been for the South Metropolitan Gas Company, who did not lose the contract because they could not do what they offered to perform, but for some other reason. Now the Guardians compare the old gas lighting with the new electric lighting, and not with what the Gas Company were offering to do, and succeeded in forcing the Electricity Company to do. The ingratitude of the Lewisham Guardians is somewhat striking.

An Alternative to Municipalization.

Allusion has previously been made to the large increase of output for traction and power purposes experienced by the London Electric Supply Corporation, Limited, and to the low average price at which they dispense their commodity, as proof that there is no occasion for a scheme on the lines of that lately put forward by the London County Council to provide London with a cheap supply of electricity. Chicago, with its 1250 million unit output per annum, has not equalled the average price of this Company with an output of some 46 millions. The Chairman (Mr. R. H. Benson) therefore hopes that the bogey which has furnished the popular excuse for yearly attacks on the parliamentary bargain on which Metropolitan electrical enterprise was undertaken, is now finally laid to rest. In his address to the shareholders at their meeting, he refused to discuss the vexed question of private as compared with municipal enterprise; but he drew attention to a solution which has been reached

for a similar problem after four years of violent dispute in one of the large and progressive cities of America. The settlement was passed by the Upper and Lower Houses of the City Council of Kansas City, and subsequently confirmed by a popular vote of 22,398 to 15,610. By it, the Municipality grant to the local Tramway and Light Company a new franchise for thirty years, after or during which the undertaking is purchasable at an agreed fixed price of £5,130,000, *plus* approved capital expenditure made during the period. In the meantime the Municipality are to receive two-thirds of the net revenue remaining after providing certain capital expenditure, and 6 per cent. upon the purchase price. In other words, the Company get 6 per cent. on the agreed valuation *plus* one-third of the profits. This is a better bargain for a municipality than fixed rates and taxes. London might, Mr. Benson thinks, do worse than copy this successful experiment.

THE PATENT OFFICE REPORT.

On the present occasion, a more than usual amount of attention will doubtless be given to the annual report of the Comptroller-General of Patents, Designs, and Trade Marks; for the year dealt with, 1914, includes a substantial period during which the war has largely affected the work of the Department. The issue is the thirty-second of the series of reports, and it bears the signature of Mr. W. Temple Franks.

The disturbed state of affairs is alluded to in the opening lines of the report, which point out that upon the outbreak of war it became apparent that its effect upon all forms of industrial property in which an alien enemy had any interest would be serious and far-reaching. As is known, the various difficulties which arose were dealt with by the Patents, Designs, and Trade Marks (Temporary Rules) Acts, which conferred upon the Board of Trade power to make rules during the continuance of the war for the avoidance or suspension of any patent or licence the person entitled to the benefit of which was a subject at war with His Majesty (and the same with trade marks and designs), and also for enabling the Board to grant licences in respect of any patent or design, and for extending the time for doing anything required to be done under the Acts. As the result, a number of applications have been heard before a Committee consisting of the Comptroller-General and Sir Cornelius Dalton, K.C.M.G., C.B., who have subsequently reported to the Board recommending the course to be adopted. In the majority of cases, licences to manufacture under the patents have been granted to proper applicants on the condition of paying a royalty to the Public Trustee until the Board might order otherwise. Such licences, if not revoked, will continue until, at the conclusion of the war, a reasonable licence has been offered to the licensee by the patentee. The ultimate destination of the royalty will, it is significantly remarked, no doubt be carefully considered by the Board of Trade at the end of the war, "when all the circumstances, including the treatment of British industrial property in alien enemy countries, will be taken into account."

Up to the end of the year, under the Acts and rules, 250 applications for the avoidance or suspension of patent rights had been made. In the case of 172 applications licences have been granted, or are now in course of being granted. On two applications, the patents have been avoided; and in one case the patent has been suspended. Of the others, 20 applications have been refused, and 39 withdrawn; while in ten cases the applications were returned as not being required by reason of the patent having expired or for some other cause; five applications were allowed to stand over; and one licence under a patent was avoided. As to trade marks, up to the end of the year 91 applications had been made; and of these, 33 were refused and 17 withdrawn, while in 21 cases registration was suspended, and in 12 registration was avoided. The remaining applications are pending.

With reference to applications and proceedings by alien enemies actually pending before the Patent Office, in the main the policy has been to attempt to carry on as far as possible all applications, and even to receive further applications from alien enemies. No patent rights are, however, granted; and the question of extending the time for the doing of any act or the payment of any fees is considered only when the applicant is in a position to pay the fees or carry on the proceedings. As regards the whole of this emergency legislation and procedure, the report says, it may be noted that the policy has not been to destroy or confiscate the patent rights, or rights arising from the registration of designs or trade marks owned by alien enemies. The course taken has been to foster the sale and manufacture of goods by giving to the manufacturer or merchant an effective security against any legal proceedings for infringement hereafter. The Acts and rules provide means by which pending applications and other proceedings before the Patent Office, where alien enemies are concerned, may be resumed at the conclusion of the war and proceeded with in due course, provided that proper reciprocity be given to British subjects in enemy countries.

Turning, now, to the ordinary work of the Patent Office during the past year, it is seen that the total number of applications for patents (24,820), shows a large falling off when compared with the year 1913, when the number was 30,077. The applications accompanied by provisional specifications fell from 19,673 in 1913 to 16,590, a decrease of 3083; and those accompanied by complete specifications decreased from 10,404 to 8230. The complete specifications filed on previous provisionals fell from 8905 to 8213; and the total number of complete specifications received was thus 16,443, as compared with 19,309, or a decrease of 2866. The proportion of complete to provisional specifications filed on application was nearly 50 per cent. The total number of specifications, provisional and complete, received was 33,033, against 38,982, or a decrease of 5949. These figures indicate the first effects of the war. Up to the outbreak, there had been a normal increase of about 3 per cent. in the number of applications; whereas during the last five months of the year there was a decrease of 41 per cent. in the applications accompanied by provisional specifications, and of 67 per cent. in those accompanied by complete specifications. The total number of specifications, provisional and complete, received before the beginning of the war was 2 per cent. more, and afterwards 40 per cent. less, than during the corresponding period of 1913. The opinion is expressed in the report that so long as the war continues there is little chance of any revival of patent business; and it is even probable that the figures will fall below their present level.

As to the results of examinations of patents, 1002 of the complete specifications filed upon applications made in the year 1913 were reported as wholly anticipated, 10,401 as partly anticipated, and 5305 as not anticipated. Of those anticipated, 10,422 were amended without a hearing taking place, and 593 after a hearing and decision. In 286 cases references to previous specifications were inserted. The applications received from women inventors last year numbered 347, compared with 497 in 1913. Out of 13,995 patents sealed upon the applications made in the year 1901, only 594, or 4·2 per cent., were maintained for the full period of fourteen years. The total number of patents which expired in 1914 was 16,408, and the total number of new patents sealed was 15,036; so that the number of patents in force was decreased during the year by 1372. Under the provisions which empower the Comptroller to revoke a patent upon application made within two years from the date of the patent by any person who would have been entitled to oppose its grant, there were fourteen applications; while the number of applications made under the section for the revocation of patents worked exclusively or mainly outside the United Kingdom was nineteen. In four of the latter cases the patent was revoked, and in eight the applications were withdrawn. One application was dismissed; and the remaining six are still pending. During the past year, one petition for the extension of the term of a patent was lodged; but it was subsequently abandoned. There are now three patents in force which have been prolonged beyond the normal period of fourteen years. An appendix showing the numbers of classified abridgements of complete specifications for the years 1910-13, gives the following figures: Gas distribution: 1910, 33; 1911, 26; 1912, 33; 1913, 39. Gas manufacture: 1910, 159; 1911, 156; 1912, 142; 1913, 147.

The receipts from patents fees last year were £287,118, compared with £307,054 in 1913; from designs fees, £7585, against £8166; and from trade mark fees, £16,439, against £17,741. The receipts from sales of publications amounted to £11,551—making the total receipts £322,829, as compared with £346,324 for the preceding year, or a decrease of £23,495. The year's expenditure—which was £194,767, as compared with £194,423—shows an increase of £344.

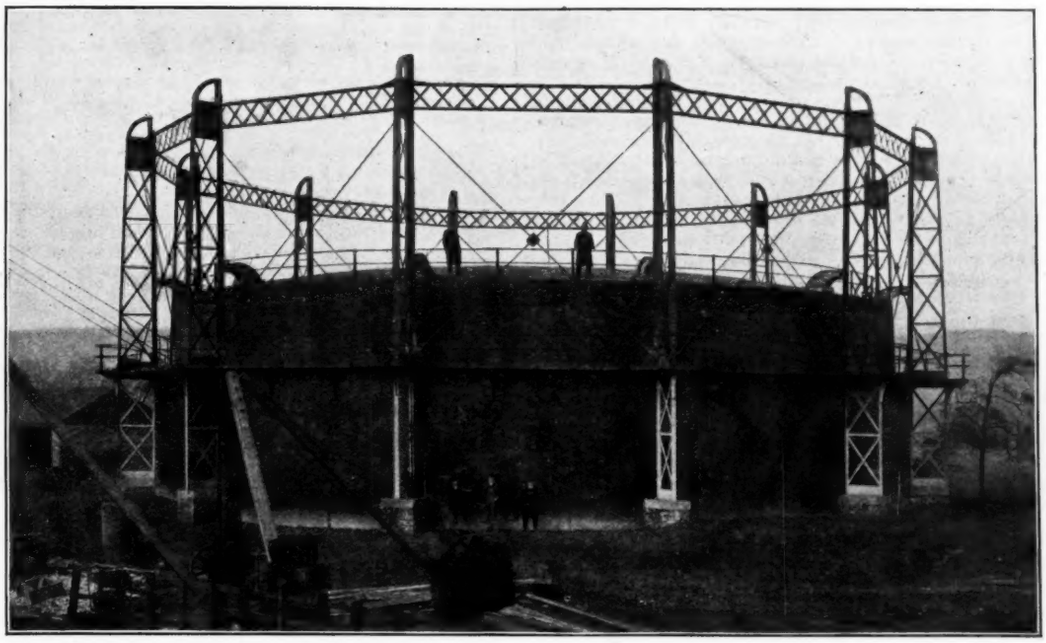
Russia and Cyanide of Potassium.

An important Council of Gold and Platinum Producers has just been held to consider the interests of the industry. One of the questions raised was the supply of cyanide of potassium, which is at the moment very scarce in Russia; while it is an important factor in the process for the extraction of gold from the Siberian and Ural quartz. The importation of cyanide has for some years been about 6000 poods per annum; but there have been years, such as 1909 and 1910, when none was imported. A suggestion was made in the Council to use cyanide of soda instead, which would cost less for carriage, it being lighter. But as it is only the cyanide of potassium that is admitted duty free into Russia, the views as to the advantages of either were undecided. On the question of producing the article in Russia, the feebly-developed coal gas industry is a drawback. The growing demand for cyanide of potassium has suggested recourse to synthesis; but such processes do not exist in the country. No doubt, says the report of the Council, they would emerge with a greater development of the coal-gas industry along with the use of other bye-products of gas-works.

Association of Gas and Water Engineers of Austria and Hungary.—It is announced in the "Zeitschrift" of this Association of the 15th inst. that the thirty-fourth annual general meeting will be held in Vienna on May 13 to 15. Members have been asked to present communications before the end of this month; and the procedure to be followed at, and the duration of, the meeting will depend upon the number and scope of the papers offered. The papers sent in will be circulated in advance and will merely be discussed at the meeting. There will be no special programme of visits and festivities. This year's meeting had originally been fixed to take place at Aussig; but, on account of the war, the change of *venue* to Vienna has been made.

A DESCRIPTION OF THE NEW GASHOLDER AT WHITTINGTON, NEAR CHESTERFIELD.

By Septimus Penny, Assoc.M.Inst.C.E.



The provision of more storage room for gas at any time is a matter for much thought on the part of nearly everybody connected with a gas company. Its imperative necessity sooner or later forces itself upon the directors, who are as a rule reasonable enough to see the position when fully explained to them by competent officials.

The design of the holder about to be described had to be especially considered, so as not to be an eyesore, or object of offence, to the neighbourhood, which is a residential one, and has been facetiously called a "Health Resort."

The general appearance, proportions, lightness, and strength of the guide-framing of the one erected at the Bedford Gas-Works arrested the attention of the author, and he subsequently obtained permission to examine it more closely. This determined him, if he was able to carry it through, to design the one for Whittington after the same pattern, as being most suitable.

The site is in a field belonging to the Company and forms part of the works, standing a little back from the road. The works are on the left-hand side of the above view.

The steel tank is 94 ft. 6 in. in diameter and 25 ft. deep. It is buried in the ground about half its depth. The gasholder is 90 ft. in diameter; and thus there is provision for a second lift when the time arrives. Its depth is 24 ft. 6 in.

There are twelve light standards round it, forming the guide-framing. Each standard rests on a solid brickwork pier, which is built upon the same concrete foundation that the tank itself rests on. The pier is carried up to a little above the ground-line, and with its stone coping it measures altogether 12 ft. vertically above the concrete foundation.

The inlet pipe is a 12-inch one, and the outlet pipe 14-inch. They are some little distance apart, owing to the route each had to take. A new valve-house was built to concentrate all the gasholder inlets; and this has proved a great improvement.

The concrete foundations, which are very important, were made of reinforced concrete, 18 inches thick throughout the site, except near the edge of the tank and under the twelve piers, where the thickness was increased to 2 feet. This portion of the work was carried out by the local firm of Messrs. Collis and Sons; and they did their work very well. The iron and steel work were supplied by Messrs. Newton, Chambers, and Co., Ltd.—remarkably well and without any hitch. They secured the contract by open competition, as also did Messrs. Collis and Sons. The cast-iron inlet and outlet pipes were obtained from the Sheepbridge Coal and Iron Company; and the valves, from Messrs. Bryan Donkin and Co., of Chesterfield.

The whole work in connection with the holder was carried out under the supervision of the author, and to his drawings and specifications.

COKING AND BYE-PRODUCTS.

By "Event and Comment."

It has been frequently stated in the Daily Press during the present war that Germany has experienced a shortage of petrol, but that she has obtained large supplies of benzol from the bye-product coke-ovens. In normal times, the supply of such benzol is, of course, dependent on the demand for coke; but Germany has a trick of getting over such artificial barriers, and we are told that the German Government has insisted on metallurgical coke being produced from the coke-ovens to the fullest possible extent. The surplus coke which is not required for the iron and steel works has been passed on to the State railways, and has also been forced upon other industrial users. In this way not only is the maximum possible supply of benzol assured for motor purposes, but there is also a large increase in the supply of toluol for the manufacture of explosives. And, according to many authorities, it seems as if the supply of these explosives is to be a very important factor in the war. Where coke-oven coke has been forced upon consumers in Germany, gas-works must naturally have suffered, They have indeed lodged protests against this so-called unfair competition; but in Germany military necessity ignores complaints of any and every character. There has been much to do in this country about the supply of toluol for the manufacture of the explosive trinitrotoluene; and plants have been erected at many of the larger works for the purpose of recovering toluol from town gas. While the writer would not for a moment suggest that anything should be done in this country which would benefit one industry at the expense of another—such as, for example, boosting coke-ovens at the expense of gas-works—yet under the stress of circumstances as they are at present drastic measures could perhaps be excused.

Waste of Beehive Ovens.

It has frequently been pointed out that an enormous waste of resources is taking place on account of the continuation of the manufacture of metallurgical coke by means of beehive ovens. Although there are no exact figures showing the amount of coal so carbonized, it is possible to estimate it fairly approximately, and the figure is generally put down as about eight to ten million tons of coal per annum. Had such a state of affairs existed in Germany, the writer ventures to think that military necessity would before now have been a sufficient excuse for the German Government to issue a decree forbidding the operation of beehive ovens. Apart from any other considerations, the supply of benzol—and hence also of toluol—would be increased by about 30 to 40 per cent. were this coal carbonized in bye-product ovens. No doubt the plea will be put forward that we have not sufficient bye-product ovens erected in this country to produce the whole of the coke required. If it comes to the point, however, this plea could not carry much weight. It is well known that the majority of bye-product ovens rarely work at their absolutely maximum capacity, and there is not the slightest doubt that, if required, almost every plant in the country could easily increase its output of coke by from 20 to 50 per cent. There are, in addition, many plants partly erected, the completion of which is not being

hurried forward on account of the war. Again, in almost every case, too, the bye-product plant attached to the ovens is laid down with a view to future extensions, and hence is able to deal with much more gas than it has actually to do. If, therefore, a considerable increase in output was required, it would only be necessary to build (say) a few more ovens to each battery; and this could be done at comparatively little cost and in a very short time. If the Government of this country will only awaken and realize the possibilities of the situation, much can be done with very little trouble.

The same question is also interesting from another point of view. Owing to the large number of miners who have enlisted, the output of coal from the pits has considerably decreased, and this, together with high freights and other causes, has resulted in an increase in the price of gas in many places. Assume for a moment that beehive ovens were abolished, there would be a very considerable saving in the amount of coal used in the production of metallurgical coke; for where a coal yields only 50 per cent. of coke when carbonized in a beehive oven, the same coal will yield almost 70 per cent. of coke in a bye-product oven. This would thus liberate a large quantity of coal for other purposes.

The Drastic Changes Required.

In considering the possibility of such a drastic change, we are up-against the old problem of beehive coke *versus* bye-product coke for furnace use. Is the quality of our iron and steel likely to suffer at all by the change? The writer thinks not. Most of the leading iron and steel manufacturers use bye-product coke to a more or less extent. Chemically speaking, there is practically not any difference between beehive coke and bye-product coke. Speaking on this topic a short time ago, a well-known American authority, Mr. C. A. Meissner, upheld the view that bye-product coke was quite suitable for all purposes, provided it was made properly. And in this proviso lies the whole *crux* of the situation! Very often specially selected coal is used for making beehive coke. If the same coal was used for bye-product coke, the latter would be every bit as good as the former. In many instances old ideas prevail for a considerable time after the establishment of the industry, and to its ultimate detriment. This is equally true in bye-product coking. When bye-product ovens were first introduced, it was fully believed that any sort of stuff would do to make into coke so long as it came out of a coal pit. Consequently, a great deal of very inferior coke was produced and the "dog got its bad name," and even to-day the bad name has not been entirely made good.

At a meeting of the Cleveland Society of Engineers a week or two ago Mr. R. Sharp read a paper on blast-furnace operation, and he referred to some of the difficulties caused, in his opinion, by the use of inferior coke—made presumably in bye-product ovens. His statements were vigorously controverted by Mr. Ernest Bury, a well-known coke-oven expert. Mr. Sharp complained particularly of soft coke and an excessive amount of breeze. It seems to the writer that the iron and steel manufacturers are themselves largely to blame for any inferior results arising from the use of bye-product coke. They will pay 20s. a ton for beehive coke, but not more than 15s. or 16s. for bye-product coke; and yet they expect the one to be as good as the other. If they are prepared to pay an equal price, they can be supplied with an equally good or even better coke. A few shillings a ton will make a considerable difference. A cleaner and purer (from sulphur and phosphorus) coal can be employed; and what is perhaps more important—according to Mr. Sharp—the coke can be screened better and all the breeze eliminated. Comparatively few of the coke-oven plants are provided with really efficient coke screens; and a little higher price would warrant the provision of this apparatus, and also give a corresponding diminution in the breeze troubles of the blast-furnace manager. If a fair, comparative test is made, the writer fully believes that bye-product coke could hold its own against beehive coke either for furnace or foundry work. Such a test, of course, means taking many factors into consideration. It must be remembered that furnaces have in many cases been designed, and methods have been moulded, to allow of the use of a particular class of coke. The author believes that here is the weak point of the situation. The blast-furnace manager is always ready to blame the coke, or anything else for that matter—rather than himself. He should, however, realize the nature of his fuel, and should modify his methods accordingly. With a little trouble the writer ventures to think that the coke from bye-product ovens could be made to yield every bit as satisfactory results as beehive coke. If German blast-furnace managers can make it do, and still hold their own in competition with this country, surely it is time that our furnace men also be-stirred themselves.

Ignorance to be Overcome.

The ignorance concerning the magnitude and importance of the bye-product coking industry in this country—even in quarters where one would expect something different—is amazing. One frequently finds that outside those directly connected with the industry very little indeed is known of it, and one also finds references in technical papers, books, &c., which would lead the reader to think that it was of no importance whatever. An instance of this has just been brought to the writer's notice, and it is worth mentioning, even if only to correct any misapprehension which may arise. A book has just recently been published, entitled "The Chemistry of Petroleum," by Tinkler and Challenger. In a chapter dealing with the destructive distillation of coal, some mention is made of bye-product coke-ovens. The necessarily abbreviated reference is certainly no credit to the authors, and would give the reader a very hazy idea of what bye-product coking really means. The following is abstracted from the part referred to:

> A large amount of coal is distilled or "de-gassed" in specially constructed ovens with the object of preparing the so-called metallurgical coke. Most of these "bye-product recovery coke-ovens" *are worked in Germany*, and the method adopted consists in carrying out the distillation of coal at as *high a temperature as possible*. The gases are drawn off, and the tar and ammoniacal liquor separated by suitable methods. After this the gases are not used for illuminating purposes (owing to the high temperature of their production their luminosity would be very low), but are led back and used for heating the coke-furnaces.

For sheer ignorance of the subject, this beats anything that the writer has previously met with. Will the authors please note that there are approximately 8000 bye-product coke-ovens in operation in *this country;* that they carbonize about 12 million tons of coal per annum; that they are not worked at as high a temperature as possible; that in many cases—and particularly in Germany—the gas is used for illuminating purposes; and that their lack of luminosity is due not to the high temperature of production, but to the fact that the principal illuminant (benzol) is extracted from the gas. These are simple facts which, by a little careful inquiry, could easily have been ascertained.

DESIGN AS A FACTOR OF UTILITY IN GAS-FITTINGS.

By Thomas Newton, of Hereford.

The relation of design to utility in gas-fittings is one of those most important considerations which are too apt to be neglected or under-estimated by those chiefly concerned in the welfare of the gas industry. An utter lack of appreciation of the true functions of art has resulted in the production of many fantastic, useless, and grotesque designs, some of which, embodying the most obvious and glaring defects, have happily defeated their own ends, and are now rapidly becoming obsolete.

A badly-designed fitting—whether a pendant, bracket, or even an adapter—not only offends the æsthetic sense, but distinctly and necessarily detracts from its purely utilitarian value. The gas profession to-day cannot afford to perpetuate obvious defects in the design and construction of any fitting; hence, the sooner these are eliminated, the better it will be for all concerned.

Regarded solely from an artistic point of view, some of the ill-conceived designs are lamentable; but from a strictly utilitarian point of view, they are even worse. Doubtless in this, as in other problems, the law of supply and demand plays an important part; but the gas profession cannot be regarded as having done its duty in this matter, until it has first educated itself, and then endeavoured to educate consumers, in the choice of useful and artistic fittings. Manufacturers should be encouraged to stamp-out the undesirable, by the gas profession cultivating a sane demand—for sheer efficiency's sake. For it should ever be borne in mind, that ornament is the handmaid of utility, and that thing is most truly artistic which best serves a useful purpose.

Some manufacturers apparently base their designs on the erroneous assumption that ornament is something fantastic, and extraneous—something which may be stuck on to a fitting without the slightest regard to utility; while others put in the wrong place what would otherwise be both useful and ornamental. There is no valid reason why ornament should be purposely divorced from utility. On the contrary, the ornamentation of gas-fittings should be conceived primarily to further some utilitarian purpose, and to afford additional strength to parts which are subject to strain and excessive wear and tear.

Occasionally, it happens that the scheme of decoration embodied in a defective design, actually subtracts from the strength already insufficiently present in the fitting itself, and it scarcely needs pointing out that this practice should be strenuously avoided. Indeed, in the design of gas-fittings, the ornamental is capable of being merged into the utilitarian to such an extent that ornament and utility in this connection may almost be regarded as synonymous terms. All ornament should tend towards utility.

Leaving the abstract, and coming now to practical considerations, all ornamentation should be preferably brazed to the fitting it is intended to adorn; and wherever possible it should appear to grow out of, or into, the fitting itself. A combination of the latter features may be conceived to yield quite a variety of artistic and useful effects.

A most objectionable method of attaching ornament to gas-fittings is by means of small clips and screws. These clips and screws frequently become loose, and the latter occasionally get lost altogether. Some makers even go so far as to drill and tap the gas-tubes for the purpose of attaching some doubtful ornamentation; and many irritating escapes of gas may be traced to this pernicious practice.

The clip and screw attachment style of decoration is common to both pendants and brackets, and a casual glance at a few examples in some catalogues will reveal its utter futility as ornament, and its worthlessness as a factor of utility. Occasionally

this so-called decoration takes the form of one or more rings of metal around the pendant stem or the bracket arm, as the case may be. One or more strips of sheet metal are then turned and twisted to some fantastic shape, and secured to the rings by means of small mushroom-headed screws. In the cheaper gas-fittings, the rings are omitted, and the gas-tubes are actually drilled and tapped to receive the screws. This kind of ornamentation is indeed a case, with a vengeance, of something being stuck on. By no stretch of imagination can it be termed artistic or even useful, since no appreciable strength is imparted to the fitting by the employment of the decorative material.

The problem of waste in manufacture is here incidentally raised; for that is surely waste which, when added to a given fitting, neither enhances its appearance nor yet increases its strength or usefulness.

A scheme of decoration which cannot be too strongly condemned is that having for its objective the representation of holly and other similar leaves, with sharp points or sharp serrated edges. All ornamentation ought at least to lend itself to the removal of dust from its surface; but even at the risk of punctured fingers, this is an impossible task with decoration of this description.

In the ornamentation of inverted pendants, there is an undesirable tendency towards superfluous decoration—particularly as regards the lower portions of the fittings. To over-decorate is much worse than to under-decorate, on account of the waste that is involved.

One might naturally be excused for thinking that the burners or globes of a two or three light inverted pendant should constitute the lowest part of the fitting, if only for the purely utilitarian function they are expected to perform in emitting uninterrupted rays of light. But so infatuated are some manufacturers with this false ideal of over-decoration, that they strain after impossible effects, with ludicrous results.

This superfluous decoration underneath the pendant proper necessarily means that the taps must as a consequence be placed in a higher, and therefore in a more inaccessible, position. A glance at a few illustrations in almost any trade catalogue will show that this type of ornamentation sometimes takes the form of a fantastic and an elaborate mass of scroll-work. Other makers are less ambitious, and prefer knobs, balls, rings, and spikes. In not a few instances the net result may be summarized as follows: A pendant, whose design is utterly devoid of artistic conception, is offered to the public to serve a purpose for which it is inadequately designed and executed, and at a greater cost than its attractiveness and usefulness warrant.

In pendant ornamentation the design should be conceived to render additional support to the arms, without in any way impeding the passage of the light rays. An inverted pendant fails in its function in so far as its downward rays of light are obstructed. Thus, in a pendant having bent arms, the ornament might be designed to flow gracefully around the inner arcs of the arms, and then preferably curve similarly to the central stem. Treated in this manner, the fitting as a whole would be greatly strengthened, since the arms and the stem would mutually support each other. In a cheaper fitting, the ornamentation should be simple and dignified; but in a more expensive pendant, the wealth of artistic detail would furnish scope for the individual expression of the designer.

Many fittings are decorated in the wrong place. In some designs this decoration takes the form of two or more insignificant leaves or sprays—stuck maybe on the arms of an inverted pendant, where they remain perched, in isolation, without the slightest relationship to their surroundings. It is difficult to perceive the ulterior object of this kind of decoration. It adds neither to the strength nor yet to the beauty of the fitting; and the fitting would be no less artistic by the removal of the excrescences. But, placed in other positions, these leaves or sprays could be made to render real service. Around the inner arcs of the arms they would be useful; and they could readily be made to conform to some artistic ideal.

Bracket ornamentation is best reserved for those having bent arms; but in all cases it should be designed to strengthen the brackets thus treated. The chief objective in utilizing ornament in this connection is to conceive of it as a tie, a support, or a stay to impart strength and rigidity to parts widely separate, which would otherwise suffer from vibration and strain. The attractiveness and artistic conception of the design need not be adversely affected as a consequence—rather will the object in view suggest original and useful lines of effort. As an adaptation of means to a given end, a design should not be vitiated by the pursuit of grotesque and futile effects.

Happily, the revival of art-metal work has directly resulted in the production of quite a variety of artistically designed and really useful fittings, and these at prices to suit all prospective purchasers, The profession, therefore, is no longer under the necessity of stereotyping such crude conceptions of art and depraved craftsmanship that have predominated in the past.

It is perhaps just as well to state that excessive price, artistic conception, and utility are not always synonymous terms. Occasionally it happens that, solely on account of the design, the most expensive fitting is by no means the best.

The foregoing should not be taken to represent an exhaustive treatment of the subject; but probably sufficient has been stated to indicate the path along which progress is desirable in the best interests of the profession and the public generally.

COAL SUPPLY AND DISTRIBUTION IN HOLLAND.

CONSTITUTION OF A COAL BUREAU.

[From a Correspondent.]

Owing to several favourable circumstances, the coal supply in Holland has so far gone well. Though prices are, of course, higher, there is a fairly regular import; that from the United Kingdom still "going strong," in spite of all sorts of floating and submerged obstacles. From Germany, also, the import is not very likely to go farther down, as the Westphalian Syndicate have guaranteed the delivery of about 60 per cent. of the quantities contracted for in normal times. Furthermore, there are in the southern part of the country (the province of Limburg) a small number of coal mines owned partly by the State and partly by private persons, and all producing semi-anthracites, household coal, and industrial or coking coal.

There is another matter, however, and that is the proper distribution of the different kinds of coal. Several industrial concerns use special sorts of coal which give the best results for their purpose in connection with their boiler plant. These firms had regulated their contracts according to their requirements; but now the period for which the contracts were made has elapsed, and they are obliged to buy on short terms. The important question now is whether the coal merchants who have supplied them up to the present find it possible to continue to supply them with the particular coals of which they are in need. In some cases they can, but in others they cannot.

In order to avoid difficulty arising from these unfavourable circumstances, the Government have taken under their supervision the distribution of coals, and by Royal Decree a Commission has been constituted for regulating the quantity delivered. On this Commission, which is presided over by Professor Ts de Vooys, and has its offices in Utrecht, are represented all industries interested in the coal trade. Consequently there were invited to join the Commission the directors of all the great coal shipping and trading firms and of the Governmental and private coal mines, the bureau of the Industrial Society, and other official persons. The gas industry is represented by the President of the Dutch Gas Association, Heer J. E. H. Bakhuis, of The Hague. The Commission is called the Coals Bureau (Kolenbureau); and its aims are not the monopolization of the coal trade in Holland. On the contrary, every coal-consuming firm in a position to get a regular supply at fair prices is allowed to do so; but in cases where firms cannot get the coals of which they are in need, or the total quantity they require, or when they think the prices are too high, they may ask the Bureau to intervene. The Bureau neither buys nor sells coals. It only obtains tenders, and when a firm is asking for assistance it is brought into connection with the tendering merchants, and then the contracts are made under the supervision of the Bureau, in order to have some influence on the regulation of prices. The general opinion is that the Bureau will prove a success.

CHARGING VERTICAL RETORTS OR CHAMBERS.

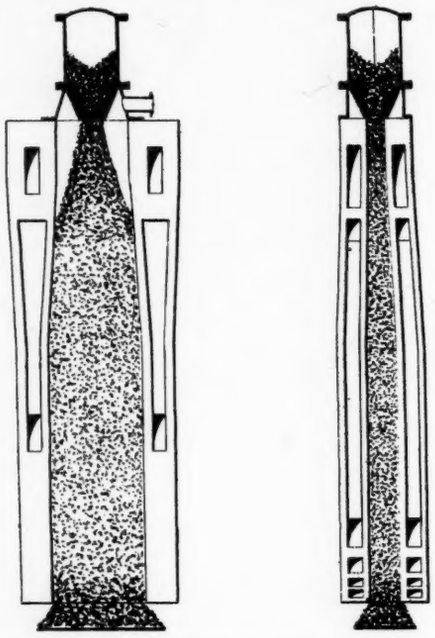
When coal is carbonized in vertical retorts, a difficulty is at times met with, owing to the changes in the form and consistency, and the consequent swelling, of the mass of material. Herren Lackmann and Meinecke have invented a device by which this difficulty is obviated; and they have taken out a patent for it for France [No. 471,196 of 1914]. The following is a translation of the principal portions of the specification.

In the usual methods of continuous carbonization, the coal entering the upper part of the retort, and slowly passing down, is subjected to distillation after the general manner, and is stopped at a given point, so that the coke at the lower end can be continuously removed. As regards this descent, the subject has to be considered from two points of view. Transformation of coal into coke is produced with increase of bulk; and this coke, occupying a larger volume, impedes the descent of the charge. On the other hand, the gas and tarry vapours liberated must pass through the higher layers of coal before being drawn off at the top of the retort. In such circumstances, as soon as the coal is subjected to the temperature of gasification (which gradually increases to 1000° C. and more), it loses the properties it possesses at the ordinary temperature, and becomes gradually softer and saturated with tarry products. When the entire section of the charge contains, at this phase of the formation of coke and of gasification, any mixture of fine coal or dust and lumps, as is generally the case, it is evident that the compactness of the layer of coal is the same in all parts of the section; so that the conditions are bad from the point of view of the transformation of coal into coke and the withdrawal of the gas produced. The invention under notice, on the contrary, allows of favourable working, by separating, by means of a special mode of charging, the mass of coal into two distinct parts, one of which contains the fine coal or dust and the other the lumps. This facilitates the removal of the gas and its passage through the mass.

To obtain the result in question, the retorts are charged through a central orifice, the section of which must be estimated from that of the retorts. The height at which this orifice should

be situated above the zone where the coal touches the sides of the retort or chamber must be such that it will correspond with the natural slope of the coal at the temperature of gasification. Whereas, in all ordinary circumstances, the coal has a natural gradient of about 45°, it is greater at a high temperature. In plant for the continuous transformation of coal into coke and the manufacture of gas, chambers are usually employed of such dimensions and section that they can be fed with a single charger placed at the top. In the case of elongated chambers such as those employed especially in gas-works, a row of charging orifices of this kind can be utilized, or simply elongated hoppers.

The present invention is represented, by way of example, in the accompanying illustrations. A rectangular chamber, or one of any other section, is provided at the upper end with a hopper or charging device connected with the receptacle containing the coal, and terminates at the lower end in a discharge orifice at the extremity of a tubular part which enables charging to be done as described. The coal, which moves gradually downwards, is gasified in the ordinary way, and, in the form of coke, reaches a receiving plate at the base of the apparatus, from which it can be easily conveyed away. The gas is drawn off at the upper part.



With this method of charging, the patentees claim that two important advantages are gained. The coal poured in at the top in the centre of the distilling column separates automatically into two parts; the lumps roll to the outside and the dust remains on the inner portion. The lumps on the extreme outside allow the heat to pass more freely and uniformly and are soon coked; and, owing to the spaces between them, the charge can be detached more easily and regularly, at any height, from the sides of the retort, so that it sinks better than in appliances as formerly constructed. From the point of view of drawing off the gas also, the regular distribution of the lumps of coal around the centre produces a column in which there are numerous spaces through which the gas and tar vapours can pass more easily. The spaces between the hottest lumps of coal and the cooler ones serve, in this case, to bring about the deposit of the tarry vapours which are formed, or to heat them by radiation, so that they are transformed into permanent gases. The effect of the mixture of dust and lumps which hitherto was very irregular was to soften the coal; and the tar formed obstructed the free passages of the column and caused considerable trouble. The steep gradient of the charge at the top of the retort has other advantages. The charge is surrounded by a relatively large free surface, so that in this part of the retort the liberated gas can escape through the spaces between the lumps without causing disturbance.

By employing the improvements described, it is possible to regulate the speed at which the coal descends, and make it correspond to the rate of distillation of different kinds of coal, without fear of producing excessive speed, which would cause obstruction of the column, both as regards the fall of the coke and the discharge of the gas. The rate of movement of the coal in the retort can, of course, be regulated by varying the bulk of the charge at a given time and the quantity of coke drawn out during the same time. The patentees claim that the varieties of coal which are quickly gasified can, with their device, be carbonized without any particular difficulty, and produce a gas of the best quality possible, which could not be obtained by ordinary methods where the charge of coal was a haphazard mixture of lumps and dust. The spaces produced by the new system facilitate this acceleration of gasification and coking; whereas the irregular heaping and the resulting compactness of the coal offered such resistance that the rate of movement could not be increased.

VERTICAL RETORTS IN THE UNITED STATES.

Large Installation at Fall River.

In the notice of the proceedings at the last annual meeting of the New England Association of Gas Engineers which appeared in the "JOURNAL" for the 16th ult. (p. 671), it was mentioned that Mr. C. W. HUNTER, of Boston, described the new setting of vertical retorts at Fall River. The following are some particulars in regard to it.

In his preliminary remarks, the author explained that in 1912 the growth of the output of the Fall River Gas Company demanded increased generating capacity at the works. The Company at that time were producing only carburetted water gas; and rising oil prices made it advisable to look into the question of manufacturing coal gas for at least part of the output. A study was made of the latest developments in the process of coal-gas generation in America and abroad, and a comparison was instituted of the annual cost to the Company of:

(1) Extending the old water-gas plant and continuing the production of straight water gas, or

(2) Installing a coal-gas plant of about a million cubic feet daily capacity, which would provide about half the output.

In making the comparison, the amount of the fixed charges on an investment for generating plant *plus* manufacturing cost, including current maintenance, was worked out for a water-gas extension, and also for four different types of retort systems—horizontals, inclines, and intermittent and continuous verticals. The enlargement of the water-gas plant was found to be impracticable, and it was eventually decided that the carbonizing process which seemed best adapted to Fall River conditions was the intermittent vertical retort system as modified for American practice by the United Gas Improvement Company; and a plant having a rated capacity of 1,050,000 cubic feet per day was contracted for.

THE INSTALLATION.

The installation consists of seven benches of nine retorts each, arranged in rows of three. The upper mouthpieces are connected by bridge-pipes, making practically one carbonizing unit of the three; so that the retort-house is handled as consisting of 21 units. Each retort is about 18 feet long, of oval cross section, 12 in. by 22 in. inside diameter at top, and 18 in. by 30 in. at bottom. The retorts, with their surrounding heating flues, are supported on steelwork about 11 feet above the ground-floor level. Just behind them are the recuperator sections, while at the back of each bench are the producers, extending from the ground to a height of about 13 feet.

Suspended from the roof trusses is a steel bunker, running the full length of the benches in line with the retorts, and holding enough coal to supply the house for about thirty hours. Over the centre of each bench are coal-valves operated by levers from the charging-floor at the level of the top of the retorts. There are also seven pockets for coke breeze built inside the bunker, with a valve over each bench. Under the bunker and over the retorts runs an electrically operated lorry, divided into three coal compartments with corresponding breeze pockets. The centres of the compartments correspond to the centres of the retorts in each row; and the charging operation consists of filling the lorry with breeze and coal from the nearest valves in the bunker, running it over the retorts, and dropping in first breeze and then coal. About 3 cubic feet of breeze and from 1650 to 1750 lbs. of coal are usually charged per retort; the lorry being arranged so that each charge of coal can be weighed.

Directly under the retorts, a hot-coke discharging shoot is operated on tracks extending the length of the house at the ground level. It is constructed of cast-iron plates hung on a steel frame, and has a slanting bottom. To discharge, first the upper lids and then the bottom doors (worked by hydraulic pressure) are opened; the hot coke dropping into the shoot, which diverts it into a De Brouwer conveyor, for transport to the coke-handling plant.

The heating gas from the producers passes first to a combustion chamber about on a level with the lowest section of the retort, where secondary air is added and the gas burnt. The products pass round the retorts in a winding path to the top, then down through the recuperators, and out to the stack. The so-called "CO_2 return" system of combustion is used. Some of the waste gases drawn from the base of the stack by a turbine blower are mixed with an approximately equal quantity of air and forced under the grates. The secondary air also is forced in, so the benches are operated partially under pressure. The secondary air and primary mixture are passed through Venturi meters before entering the individual benches; and the system is provided with valves and outside dampers to permit close regulation. The grates are of the hand-shaking type, and the producers are fed with hot coke transferred from the bin by small cars with inclined bottoms.

Each bench has an individual hydraulic main with three dip-pipes, one from each row of retorts. Constant circulation of liquor is maintained through the hydraulic main; tar being drawn from the bottom by a balanced drainage system. The liquor level is regulated by a weir overflow, and during the time of charging the seal can be raised rapidly by admitting liquor from a 600-gallon tank located in the roof trusses. The gas from

the hydraulic main is collected in the retort-house header, and passes through a governor to the condensing system.

Coal and Coke Handling Plant.

Coal is received in ocean-going barges which dock at the end of a wharf some 465 feet from the retort-house. The general ideas which it was endeavoured to incorporate in the design of the handling plant were first the protection of coal used in daily operation from the effects of weather; and, secondly, the utilization of the existing wharf, which is a square of approximately 200 feet to a side, to the best possible advantage for coal storage at the lowest investment cost. With these ideas in mind, it was decided to erect a "running" storage bin of sufficient size to contain about 2500 tons (approximately a barge load and a half), which could be filled and emptied by gravity; and to store in it all coal intended for regular operation of the plant. An emergency store, mainly for use in case of prolonged interruption of service—such as a strike at the mines, &c.—is piled in the open.

The coal-handling arrangement that worked-out as most suitable for the ground is probably best described as being a modification of the "mast and gaff" type. It consists essentially of a central structural steel mast, supported on a concrete foundation, and held vertical by two stiff legs. From the mast are swung two horizontal booms, both of which may be moved completely around it as a centre. The upper boom, which is about 118 feet long and at a height of 50 feet from the ground, carries a trolley track, on which runs a 1⅛-yard Haywood bucket. In its normal position for unloading, this boom extends over the barges at the end of the wharf; but, by swinging it round, coal can be reclaimed anywhere within the circular area round the mast. The bucket delivers the coal into a steel feeding-hopper in the steelwork of the mast, from the bottom of which it is fed on to a belt supported by the second boom, which swings about 21 feet from the ground. This belt carries a tripper; and by turning the belt boom round the mast, coal can be deposited anywhere in a circular pile 20 feet deep round its base. The boom having about 110 feet working radius, something like 13,000 tons can be placed in this outside storage pile. For regular running, however, the belt boom is set over the crusher, through which the coal passes to an inclined belt system whereby it is conveyed to the top of the running storage bin—a circular concrete structure, 50 feet in diameter, with conical bottom. Each morning the day's supply of coal for the retort-house is conveyed by the belt system across the railroad tracks to the thirty-hour storage bunker over the retorts. The coal-handling plant is operated by electricity, and has a capacity of 100 tons per hour.

Coke from the retorts is discharged into a 30-inch De Brouwer conveyor designed for hot coke, conveyed to the end of the building, and then up an incline to the top of the coke bunker, where it passes through a crusher and then over a vibrating screen for separation into the various sizes. The bunker itself is a reinforced concrete structure of about 200 tons capacity, located beside the railroad spur leading into the plant; and, by gravity, railroad cars can be loaded on one side and coke waggons or trucks on the other. Directly underneath the bunker are bagging shoots and storage platforms for bags.

The coke for storage is handled by a remote control monorail system with a self-tripping bucket. This consists of a trolley carriage, with hoisting motor, which runs on the lower flange of a 12-inch I-beam supported 40 feet from the ground. The trolleying and hoisting movements are regulated from a controller located on the ground at the coke-bunker, and handled by one man. The bucket is filled from the waggon-loading shoots at the bunker, and is raised and conveyed out to the storage pile, where the bucket trips when it comes in contact with the pile, allowing the coke to spill out without excessive fall. The coke from the retorts is quenched as it passes through the wall of the building, and the steam is carried away through a vapour stack. About half way up the incline, and directly under the conveyor, is a circular steel bunker lined with fire-brick, into which, at intervals, hot coke is deposited, to be charged into the producers.

Test Results.

The first retort was charged on May 3, 1914, and on the 13th of July a thirty-day test was commenced to establish the guarantees made by the Contractors. During the test the benches were operated by the Contractors' engineers, and the rest of the plant by the Gas Company. No extraordinary methods of operation were used in order to raise the general results. The retorts were thoroughly scurfed before starting, and only a little burning-out had to be done. Except for this, and also a certain amount of extra supervision, the plant was run as it would be in regular operation. The average temperature in the hottest part of the combustion chamber was 2443° Fahr., with a maximum of 2570° Fahr., and a minimum 2318° Fahr., as read by a Wanner pyrometer. Three-quarter inch screened Westmoreland coal was used, of the following proximate analysis:

	As Received. Per Cent.		Dry Basis. Per Cent.
Moisture	2·15	..	—
Volatile matter	33·80	..	34·54
Fixed carbon	57·50	..	58·77
Ash	6·55	..	6·69
	100·00		100·00
Sulphur	1·14	..	1·16

The average results for the thirty days were as follows:

Gas produced per day, corrected to 30 in. bar. and 60° Fahr.	1,083,000 cub. ft.
Do. per pound of coal dry	5,434 ,, ,,
Do. per pound of coal as charged (*i.e.*, including moisture)	5,314 ,, ,,
Illuminating power by Sugg's "D" burner	16·71 candles.
Candle-feet per pound of coal dry	90·80
Do. per pound of coal as charged	88·80
Ratio of bench fuel to coal dry	14·19 per cent.
Do. as charged	13·88 ,, ,,
Ratio of total coke to coal dry	71·60 ,, ,,
Do. as charged	70·60 ,, ,,
Ammonia produced per 2000 lbs. of coal dry	7·30 lbs.
Do. per 2240 lbs. of coal as charged	7·98 ,,
Tar produced per 2000 lbs. of coal dry	14·70 gallons
Do. per 2240 lbs. of coal as charged	16·10 ,,
Averaged specific gravity of gas	0·4355
Average H.C. dew-point	55° Fahr.

The plant was turned over to the Gas Company for operation during the latter part of August, since which time they have been trying a number of different kinds of coal. The results for six months, taken from the monthly operating reports from July 1 to Dec. 1, 1914, are as follows:

Gas produced per day (corrected)	1,013,000 cub. ft.
Do. per pound of coal as charged (corrected)	5·17 ,,
Illuminating power by Sugg's "D" burner	16·70 candles
Candle-feet per pound of coal as charged	86·30
Ratio of bench fuel to coal as charged	14·30 per cent.
Tar per 2240 lbs. of coal as charged	15·15 gallons
Ammonia do.	6·64 lbs.

From Jan. 3 to Jan. 24, 1915, ¾-inch screened Westmoreland coal only was charged, with the following results:

Gas produced per day (corrected)	1,021,000 cub. ft.
Do. per pound coal as charged (corrected)	5·36 ,,
Illuminating power by Sugg's "D" burner	15·97 candles
Candle-feet per pound of coal as charged	85·54
Ratio of bench fuel to coal as charged	14·18 per cent.
Tar per 2240 lbs. of coal as charged	17·10 gallons
Ammonia do.	7·22 lbs.

Miscellaneous Operating Features.

The retort-house labour per 24 hours is 81 hours, apportioned as follows:

Four regular operators, at 11 hours per day	44 hours
Two labourers (cleaning ashpits and hydraulics and sweeping building), at 10 hours per day	20 hours
One labourer elevating breeze to overhead burkers	8 hours
Scurfing	1 hour
Regulating heats	8 hours

On the basis of a 12-hour day, this equals 6·75 men, or about 150,086 cubic feet of gas per man per day. The work performed includes all operations in the retort-house except depositing the coal in the overhead bunkers and handling the coke after it has passed out of the retort-house. It is necessary to scurf each retort about every seven weeks. The hydraulic mains, which are fitted with pitch-pans, are cleaned out once a week. For one week, out of 819 retorts discharged, 128, or 15·6 per cent., stuck so as to require some poking from the bottom before the charge dropped.

The benches have been operated with from 9 to 9½ per cent. of carbon dioxide in the primary mixture entering under the grates. It is found that the heats on the benches can be lowered or raised very accurately by changing this percentage. The retort-house operators shake the producer grates about four times a day; the ashes being removed and screened by a labourer. No clinkering has been done since the plant started last May.

The coke made is of excellent colour and structure, weighing about 32 lbs. per cubic foot. The tar is thin and easily handled—an average of one week's samples analyzing as follows:

Specific gravity	1·127
Moisture (by volume)	3·40 per cent.
Free carbon	3·74 ,, ,,
Calorific power	15,944 B.Th.U.

Distillation.

Up to 338° Fahr.	8·00 per cent.
338° to 437° ,,	12·30 ,, ,,
437° to 518° ,,	10·30 ,, ,,
518° to 680° ,,	23·00 ,, ,,
Balance	48·50 ,, ,,

This analysis shows about 8 per cent. of light oils and 45·6 per cent. of creosote oils. The samples were taken during the test from the tar-chamber of the separating system, and they run rather high in moisture. The last shipment made from the plant, consisting of somewhere about 150,000 gallons, had a moisture content of 1·3 per cent.

Four samples of gas were analyzed during the test; the average results (per cent. by volume) being as follows:

CO_2	1·2	CO	6·9
C_2H_6	0·9	CH_4	28·8
Illuminants	4·1	H_2	51·9
O_2	1·0	N_2	5·3

The average illuminating power was 17·2 candles. From several tests taken, the gas appears to contain from 10 to 15 grains of naphthalene per 100 cubic feet, at the meter. No indication of a stoppage has been seen. Tests made on eleven days during the period from Jan. 3 to Jan. 24, 1915, show a calorific value of the gas of 608 B.Th.U., and a calorific multiple of 3269 per pound of coal as charged; the average illuminating power on these days being 16·1 candles.

EFFICIENCY TRIALS AT THE ÓBUDA GAS-WORKS AT BUDAPEST.

At the last annual meeting of the Association of Gas and Water Engineers of Austria and Hungary, held at Budapest, Professor J. Pfeifer, of the Technical College of that city, read a paper on the efficiency trials of the plant at the new Obuda Gas-Works which had been conducted by a Committee of which he was Chairman. The other members of the Committee were the Chief Engineer Viktor Schön, representing the City of Budapest, which owns the gas-works, and the Engineer and Chemist, Hugo Klein, representing the firm responsible for the constructional work. The paper has been reprinted in the "Zeitschrift des Vereines der Gas- und Wasserfachmänner in Oesterreich und Ungarn" of the 1st and 15th ult., from which source the following particulars are taken.

A programme for the conduct of the efficiency trials on the new plant was first agreed upon. The chief points in this programme included:

(1) The collection of the data of the trials from the observers on printed forms for each day (ending at noon) and the summarizing of these data.

(2) The collection of samples, in triplicate, for analysis in the laboratory of the gas-works under the supervision of the Committee.

(3) The standardization or proving of all measuring plant and instruments, such as meters, weighing-machines, calorimeters, thermometers, &c.

(4) The trials to be conducted on two benches comprising 39 chamber ovens in all. The fuel for heating the chambers to be obtained wholly from producers fed with brown coal or lignite—the high-pressure coke-breeze producers being made the subject of a separate test. The trials to go on until perfectly trustworthy results were obtained; and if there should be any unforeseen interruption of the trials, they should be started afresh.

(5) The fulfilment of the contractor's guarantees to be judged by: (*a*) The total production of gas in twenty-four hours, as determined from meter readings every hour, and corrected to standard conditions (15° C., 760 mm., saturated—practically identical with the English standard conditions of 60° Fahr. and 30 inches); (*b*) the yield of gas per ton of coal, as determined from the foregoing production of gas, and the weight of coal charged into the chambers—the coal being sampled as weighed, and its moisture and ash content determined. The yield to be calculated per ton of the coal as used, per ton of standard coal—*i.e.*, a uniform content of 2½ per cent. of moisture and 8 per cent. of ash—and per ton of dry ash-free coal; (*c*) the calorific power (gross) of the gas, as ascertained from tests made once an hour on samples drawn continuously from a main through which the gas made was passing, the results being checked by comparison with the record of a registering calorimeter; (*d*) the temperature of the chamber walls, as observed in particular flue passages by a Wanner pyrometer; (*e*) fuel consumption, as determined by weighing each charge of brown coal put into the producers, the fuel in which was brought to the same level at the end as at the beginning of the trial, and determining the moisture, calorific power, and hydrogen content of the brown coal as sampled from each charge. The fuel consumption was calculated to a uniform basis of brown coal of 7560 B.Th.U. per lb.; (*f*) the steam consumed in the producers, as determined in a special series of tests in which, at various positions of the valve and various pressures, the steam was condensed for a given time and weighed. The fuel consumed to produce steam was added to the fuel consumption in the producers, the consumption per pound of steam being 0·206 lb. of brown coal of the accepted calorific power of 7560 B.Th.U. per pound; and (*g*) the productive capacity of the producers, which was required to be such that, with an output of 9,530,000 cubic feet of coal gas per diem, three producers would remain in reserve.

(6) The power, which was distributed from three switch-boards, each with a kilowatt meter, was measured separately for the following groups of requirements—viz. (*a*) Working the rotating grates of the producers; (*b*) driving the low-pressure fans of the brown coal producers and the high-pressure fans of the coke-breeze producers; (*c*) working the disintegrators and suction fans of the producer gas plant; (*d*) pumping the water used in the producers; (*e*) driving the machinery for charging and discharging the chambers, quenching the coke, &c.; and (*f*) working the coal breakers and conveyors.

(7) The determination of the carbonic acid and nitrogen in the coal gas made was carried out every day on two samples in large carboys, each collected throughout a period of twelve hours by exhaustion at a uniform rate. These samples did not quite truly represent the average of the gas made, because twice as much gas is produced in the first hour after charging the chambers as in the last hour; so that the mean calorific power of the gas could not have been properly deduced from analyses of these samples. But since the proportion of carbonic acid and nitrogen in the gas does not vary greatly at different hours of carbonization in chamber settings, the samples could fairly be accepted for determinations of these two constituents.

(8) The yields of tar and ammonia were determined for a month's working of the plant, as a fair average could not be ascertained for a shorter period. The coal carbonized was taken from the works' records, the level of the tar in the tar-well was taken at the beginning and end of the month and the quantities pumped from the well during this time recorded, and, similarly, the stocks of liquor and the sulphate made were taken from the works' books.

(9) The water used to cool the frames of the doors and the ascension pipes of the carbonizing chambers, and in cooling the producers was read off on water-meters at regular intervals of twenty-four hours.

(10) Sundry observations—viz. (*a*) The efficiency of the fans or blowers; (*b*) the capacity and efficiency of the coal breakers and conveyors; (*c*) the temperature and composition of the gases leaving the last flue of the settings; (*d*) the composition and calorific power of the producer gas, found from two samples each day, each being collected during six hours; (*e*) the composition and calorific power of the lignite or brown coal, found from average samples of that charged into the producers; (*f*) calculation, from the last two [*d* and *e*] observations, of the quantity of producer gas made—with an allowance for the carbon in the tar, flue dust, and clinker; (*g*) the composition and calorific power of the coal carbonized; (*h*) the quantity of coke produced, and its content of moisture and ash, and (*i*) the illuminating power and specific gravity of the gas made, as found from tests carried out every hour throughout one day of the trials.

(11) Labour required by the plant.

The trials, carried out according to the foregoing programme, extended continuously over a period of six days—from the 21st to the 27th of February, 1914. The results are given in detail in a tabular statement, from which the following deductions are drawn.

The carbonizing plant was found to have a productive capacity of 9,537,140 cubic feet (at 60° Fahr., 30 inches, and saturated) per twenty-four hours. The capacity guaranteed by the contractors was 9,535,210 cubic feet.

The make of gas per ton of coal, corrected to the grade of coal adopted as the standard—viz., containing 2·5 per cent. of moisture and 8 per cent. of ash—averaged 12,734 cubic feet at 60° Fahr., 30 inches, and saturated. The make guaranteed was 12,470 cubic feet per ton.

The brown coal used for heating the retorts, reduced to the standard grade of 7560 B.Th.U. per pound, amounted to 18·7 per cent. by weight of the coal carbonized. The consumption had been guaranteed not to exceed 21·4 per cent.

The power used amounted to 2358·7 B.Th.U. The power requirements had been guaranteed to be less than 3168·2 units.

The proportion of nitrogen in the coal gas averaged 5·25 per cent., with a maximum of 7·40 per cent.; whereas the average over three months had been guaranteed not to exceed 6 per cent., and the maximum not to exceed 8 per cent. The nitrogen estimations were continued in the regular working of the plant, and gave an average of 5·41 per cent.

The temperature of the settings ranged from 1310° C. to 1462° C., with a mean of 1378° C., as compared with 1350° C. named by the contractors. The temperature of the spent gases ranged from 230° C. to 265° C.; a mean of 250° C., as compared with 220° C. put forward (but not guaranteed) by the makers.

The proportion of carbonic acid in the coal gas averaged 3 per cent., with a maximum of 4·2 per cent., whereas 4·5 per cent. had been the anticipated maximum.

The yield of tar averaged, over one month, 4·85 per cent. by weight of the coal carbonized. An average of 4 per cent. had been named by the contractors.

The yield of ammonia, over one month, averaged 0·23 per cent. of real ammonia by weight on the coal carbonized. It had been anticipated that a yield of 0·33 per cent. would be secured.

The average illuminating power of the gas in the Carpenter burner was 11·2 Hefners (10·1 candles); and the average specific gravity was 0·442.

The water consumption, per twenty-four hours, on the carbonizing chambers was 211,780 gallons and 102,390 gallons on the producers; making a total of 314,170 gallons. A consumption of 484,220 gallons per twenty-four hours (for an output of 9,535,210 cubic feet of gas) had been allowed for.

The steam consumption of one producer per hour was 357 lbs., as compared with 550 lbs. quoted as a maximum. The fuel consumed in producing the steam was worked out in terms of brown coal of 7560 B.Th.U. per lb., and added to the quantity of coal used in the producers to arrive at the total fuel consumption for heating the carbonizing chambers.

The steam consumed in keeping the ascension pipes clean had been given at 11 lbs. per chamber; but as the blowing-out of the pipes was carried out only irregularly during the trials, no check was taken on this estimate.

A low-pressure fan had been quoted as forcing 495,000 cubic feet of air to a pressure of 8 inches, when working at 54 amperes. In the trials, only 41 amperes could be used; and as 91 per cent. of the quoted volume of air was then obtained, it was considered unnecessary to repeat the test in full working conditions.

The high-pressure fan forced 153,000 cubic feet of air to a pressure of 20 inches, in comparison with 127,000 cubic feet quoted for it.

The suction fans placed after the disintegrators, which should have forced 883,000 cubic feet to a pressure of 16 inches, were not tested for efficiency, as it was ascertained in the trials that the quantity of gas required to heat 39 chambers—viz., about 530,000 cubic feet per 24 hours—could be delivered by a single suction

fan. This means that when 78 chambers are in action, there will be two fans in reserve, instead of only one, as intended.

The two coal-breakers and a band conveyor conveyed 120 tons, as compared with 140 tons quoted for them.

The power required by the producer plant was 2076·3 B.Th.U., against 2368·0 B.Th.U. named by the contractors; making with that required for working the carbonizing plant (including breakers, conveyors, charging waggons, discharging machines, quenching plant, &c.) a total of 2358·7 B.Th.U., against 3168·2 B.Th.U. named. This power was for an output of 9,535,210 cubic feet of gas per diem.

The labour required was found in the trials to comprise eighteen men and two foremen for the carbonizing plant, two men for the conveying plant, and ten men for the producers. This makes a total of 32 hands for an output of 9,535,210 cubic feet of gas per diem, compared with the contractor's estimate of 31 hands.

The following are particulars of trials of the two types of producer, and of the coal carbonized and coke produced in the plant. The brown coal or lignite which was gasified in the lignite producers during the trials had the following composition: Carbon, 54·32; hydrogen, 4·26; combustible sulphur, 2·88; moisture, 13·13; ash, 12·27; oxygen and nitrogen, 13·14 per cent. Its calorific power was 9049 B.Th.U. per lb. The average consumption of each producer in 24 hours was 14·624 metric tons. The gas made in these producers had the following average composition, in volumes per cent.: Carbonic acid, 4·91; heavy hydrocarbons, 0·28; sulphuretted hydrogen, 0·30; oxygen, 0·36; carbonic oxide, 25·87; methane, 3·48; hydrogen, 15·23; nitrogen, 49·57. The net calorific power of the gas averaged 155 B.Th.U. per cubic foot at 60° Fahr. 30 inches and saturated. The volume of producer gas made per ton of brown coal averaged 81,810 cubic feet.

The coal carbonized during the trials had the following composition: Carbon, 73·42; hydrogen, 4·71; combustible sulphur, 0·70; moisture, 3·40; ash, 9·27; oxygen and nitrogen, 8·50 per cent. The yield of coke averaged 75·1 per cent. by weight of the coal carbonized, and, as broken, was distributed in the following grades: (1) Large coke, above 2 inches, 38·82 per cent., containing 2·14 per cent. of moisture and 11·22 per cent. of ash; (2) small coke, between 1 and 2 inches, 48·81 per cent., containing 7·32 per cent. of moisture and 11·44 per cent. of ash; (3) coarse breeze, between 0·4 and 1·0 inch, 7·58 per cent., containing 11·02 per cent. of moisture and 14·89 per cent. of ash; and (4) fine breeze, less than 0·4 inch, 9·79 per cent., containing 18·03 per cent. of moisture and 17·99 per cent. of ash.

A special investigation was made of the high-pressure producer consuming coke breeze, because it represented a type with which comparatively little experience had been had. The coke breeze gasified in it, being granules of 0·2 to 0·4 inch in size, had the following composition: Carbon, 69·91; hydrogen, 1·04; combustible sulphur, 0·57; moisture, 7·36; ash, 19·48; oxygen and nitrogen, 1·64 per cent. Its calorific power was 10,939 B.Th.U. per lb. The gas made in the producer, on testing, showed the following mean composition, in volumes per cent.: Carbonic acid, 5·10; oxygen, 0·06; carbonic oxide, 26·26; methane, 1·10; hydrogen, 10·82; nitrogen, 56·66. Its net calorific power was given as 122·6 B.Th.U. per cubic foot. The temperature of the gas on leaving the producer was 315° C.; and it contained 100 oz. of moisture per 1000 cubic feet. The gas also contained 1·086 oz. of blown ash per 1000 cubic feet. The carbon content of the clean gas was 173·89 oz. per 1000 cubic feet. There was obtained for every 100 lbs. of fuel gasified 24·76 lbs. of dry clinker, of which 21·32 per cent. was carbon, and 78·68 per cent. was ash. The fuel consumption of the producer averaged 1120 lbs. per hour; and the steam consumption 0·484 lb. per lb. of fuel. The gas made per ton of coke breeze averaged 132,762 cubic feet. The heat value of the fuel and steam introduced into the producer —viz., 10,939 B.Th.U. per lb. of fuel and 574 B.Th.U. in the steam per lb. of fuel, was found to be distributed as follows: In the calorific value of the producer gas, 67·75 per cent.; in the producer gas as sensible heat (at 315° C.), 5·55 per cent.; in the gas produced, as sensible heat of undecomposed steam, 4·14 per cent.; lost in the clinker, 6·68 per cent.; lost in the blown ash, 0·42 per cent.; and loss by radiation and conduction and unaccounted-for, 15·46 per cent.

The Increased Price of the South Metropolitan Company.

At the request of the Directors, a circular has been issued to the shareholders of the South Metropolitan Gas Company by the Secretary (Mr. F. M'Leod) explaining, in the same way as was done to the consumers, the causes of the temporary increase in the price of gas [see "JOURNAL" for March 23, p. 721]. These causes, it is pointed out, may be summed up in "excessive charges for freight," as to which the circular says: "There being no immediate remedy for this, an increase in the price of gas was inevitable. But the Directors have every reason to believe that it will be soon corrected, as they are taking steps to deal with the freight trouble by the purchase of steam colliers, two of which are already carrying our coal." As to the effect of the increase in price on the dividend, it is remarked: "By reason of the operation of the sliding-scale, the dividend payable on the ordinary stock will be automatically reduced from £5 4s. per cent. per annum (the amount last declared) to £4 8s. per cent. per annum for the half year now current; and the Directors thought it would be for the convenience of the shareholders to give this early intimation."

THE EXTINCTION OF FLAMES.

The subject of the extinction of flames has lately been dealt with by Dr. W. P. JORISSEN, of the Leyden University, in an interesting article in "Het Gas." The following translation, for which we are indebted to an esteemed correspondent, will give some indication of the scope of the communication.

Every science, every industry, has such a thing as a lumber-room, and those who take the pains to rumble in the forgotten heaps of antiquities are sometimes rewarded by finding a very interesting or a very useful stowaway. It was by so rumbling that the author lately found in this lumber-room a treatise on coal gas by a Dutch reverend gentleman of the name of Bernard Köning. It was in the year 1809, and therefore rather more than a century ago, that this illuminating gentleman made gas from coal by carbonizing it in a retort with the simultaneous introduction of steam. The results were very good, but the illuminating power of the gas was not very satisfactory; and so the process was put aside. This once more proves that "there is no new thing under the sun," for we may well regard this Dutch King (*könig* = king in English) as the inventor of wet carbonization.

But the author has also gone to the lumber-room of chemistry, and this time he found there a number of totally forgotten investigations on the extinction of flames; and now it is Cavendish who has been so ill-treated that his work on this subject has totally disappeared below the surface of chemical knowledge. Cavendish studied flame and its extinction about the year 1766, before the composition of air was sufficiently known. He prepared mixtures of air and varying quantities of carbon dioxide (then called "fixed air"), and introduced lighted candles into them. When the volume of the carbonic acid was one-tenth of the bulk, he found that the candle burnt for 11 seconds; but when the percentage was raised only slightly—viz., up to 6·55ths, or 1·9½ of the bulk—the flame of the candle was extinguished almost immediately. When calculating the percentage of oxygen in this gaseous mixture, the result is 18·7 per cent. in volume.

More than a century afterwards, Clowes and Feilmann, unaware of the experiments of Cavendish, made experiments on the same lines; and their results correspond perfectly with those of Cavendish, as they found that the flame of a candle is extinguished when the amount of oxygen in the carbonic acid and air mixture falls below 18·1 per cent. It may be that the two investigators named, when starting their experiments, had some knowledge of the investigations of Rutherford (1772)—viz., that phosphorus remains burning in air in which a burning candle has been extinguished. But, at all events, they did not know of the discovery by Priestley, who found, about the year 1772, that an animal is able to live almost as long in air in which a burning candle is extinguished as in pure air.

Now the curious thing is that not only have all these discoveries of more than a century ago disappeared in the lumber-room of science, but also those of Clowes and Fielmann, for these have received such trifling attention that until a few years ago they were not to be found in any compendium or handbook of chemistry. Even Ostwald, in his "Introduction to Chemistry" (1910), when speaking of the extinction of the flame of a candle in a closed bottle, says that the burning ends are where the oxygen is consumed.

This failure of Cavendish's discovery to become generally known has caused a great amount of unnecessary work to be done in practical life. One instance may prove this. Until a few years ago, it was the custom, in one branch of the Government service, for boilers temporarily out of service to be preserved in the following manner: After the boiler had been emptied and cleaned, it was dried by means of a low charcoal fire on the ash-plate. Then the boiler was "gassed." For this purpose a number of metal dishes containing burning charcoal were put into the boiler, which was then closed. The object of this proceeding was to eliminate all oxygen from within the boiler, to prevent rusting. In order to test whether or not the gassing was done thoroughly the boiler was opened on one side and a lighted candle introduced. In the event of extinction, the operation had been effectual. The sapient men who ordered this method of testing did not know that the flame of a candle is extinguished when the proportion of oxygen in the air has fallen from 21 to about 18 per cent. It is therefore inapplicable. Burning charcoal does not eliminate all the oxygen, for experiments made by the author demonstrated that only one day after the gassing the quantity might vary between 6·2 and 10 per cent. Even the flames of different combustibles very vary greatly in regard to their limit of oxygen, as shown in the following table (the figures being percentages):

Kind of Flame.	Natural Extinguishing Atmosphere.		Artificial Extinguishing Atmosphere.		
	Oxygen.	Nitrogen.	CO_2 Added.	O_2.	$CO_2 + N_2$.
Candle	16·4	83·6	14	18·1	81·9
Hydrogen	6·3	93·7	58	8 8	91 2
Carbon monoxide	15·1	84·9	24	16·0	84·0
Methane	17·4	82·6	10	18 9	81·1
Ethylene	13 2	86·3	26	15·5	84 8
Petroleum	16·2	83·8	15	17·9	82·1
Ethyl alcohol	16·6	83·4	14	18·1	81·9
Methylated spirits	17·2	82·8	13	18·3	81·7
Coal gas	11·3	88·7	33	14·1	85·9
Flax	16·0	84·0	—	—	—

These figures show that carbonic acid has greater extinguishing

power than nitrogen. The opinion of Clowes was that this phenomenon is caused by the higher specific gravity of the carbonic acid, "which renders sluggish the movement of air to feed the flame." But, as the author lately demonstrated, the greater extinguishing power of carbon dioxide is a function of its greater molecular specific heat and its greater conductivity for heat. Certain it is that a burning candle or an oil-lamp is not the right instrument to use for testing the respirability of air, as it has been found that the proportion of oxygen in air may fall far below 16 per cent. (even to about 10 per cent.) before the air has ceased to be respirable.

Clowes and Feilmann have also made investigations in regard to the composition of the gaseous mixture remaining when a flame has been extinguished in a closed vessel. For this purpose they used a glass bell standing in a porcelain dish with mercury. In the upper side of this bell there was a tube closed with a piece of rubber having two holes, one for a glass cock, the other for a small water-gauge. On the mercury was floating the lighted candle or a small oil-lamp. There was also an arrangement for burning gas, for which purpose a small platinum capillary tube had been brought through the mercury to the inside of the bell.

The author has arranged another very simple apparatus. He has taken a bottle of about two gallons capacity, and having also a tubulure on the side near the bottom. This tubulure is connected by a rubber tube with a small flask filled with mercury, so that by this arrangement the pressure within the bottle can be kept constant. Into the neck of the bottle is fixed a rubber cork having two holes, one for a glass cock and the other for a small glass tube bent at the end, and having fixed at this end a small platinum capillary. Through this tube the gas is passed and burnt at the end of the platinum tube. As it is very difficult to state the exact moment when the flame extinguishes, as its illuminating power decreases considerably towards the end, there have been fixed to the platinum capillary some fibres impregnated with chloride of sodium, so that the flame becomes slightly yellow. At the same moment that the flame is extinguished, the gas supply is discontinued. After the bottle and its contents have cooled down to atmospheric temperature, the gaseous contents are analyzed with the Orsat or the Hempel apparatus. A short time ago, Harger used another apparatus, and gave a description of it; but the features are almost the same. The results of these experiments are given in the following table:

Nature of the Flame.	Remaining Atmosphere. Oxygen. Per Cent.	Nitrogen. Per Cent.	Carbon Dioxide. Per Cent.
Candle (Clowes)	15·70	81·10	3·20
,, (Burrell)	16·24	80·81	2·95
Soft candle (Harger)	16·90	—	—
Kerosene (Clowes)	16·60	80·40	3·00
,, (Harger)	16·90	—	—
Petrol spirit (Harger)	16·90	—	—
Gasoline (Harger)	15·50	—	—
Alcohol (Clowes)	14·90	80·75	4·35
Methylated spirit (Clowes)	15·60	80 25	4·15
Coal gas (Clowes)	11·35	83·75	4·90
Natural gas (Burrell)	13·90	82·85	3·25
Hydrogen (Clowes)	5·50	94·50	—
,, (Harger)	7·50	—	—
Carbon monoxide (Clowes)	13·35	74·40	12·25
Methane (Clowes)	15·60	82·10	2·30
Acetylene (Burrell)	11·70	82·00	6·30

The extinguishing of flames of mixtures of carbon dioxide and air, when the percentage of oxygen falls below a certain limit, corresponds principally with the attainment of the upper explosion limit with mixtures of a combustible gas and air, as results from the following reasoning: (*a*) Into the centre of a large quantity (in order to eliminate the effect of the sides of the vessel) of an oxygen-nitrogen mixture a combustible gas is conveyed by means of a small tube. This gas is ignited—say, by an electric spark. In the event of the composition of the mixture being near the extinguishing limit, the temperature of the flame is almost instantly lowered so much that the supplied combustible gas cannot be afterwards ignited, and the flame goes out. (*b*) In the centre of a large volume of a mixture of air and combustible gas ignition is caused by means of an electrical spark. Local combustion takes place, causing development of heat. When the upper limit of explosion is almost reached, the formation of a small flame is possible. The flame tries to extend itself; but the fall in temperature very soon causes extinction. The difference between these two cases evidently lies only in the outer portion of the two flames—this being in the first case only oxygen and nitrogen, and in the second case combustible gas, oxygen, and nitrogen.

The results of the several experiments made on the subject of the extinction of flames in closed vessels and the attainment of the upper limit of explosion are not perfectly comparable with each other, owing first to the varying effects of the sides of the vessels, and secondly to the variations in temperature and pressure. The explosion experiments have sometimes been made in small, and at other times in quite large, flasks, in narrow or in broad cylindrical vessels; and combustion has been effected in bottles or bells of very different volume. It follows, therefore, that there might have been great difference in the temperatures and pressures before the flames were extinguished. Further, the method of ignition also has a great influence. But, taking into consideration the different factors which may affect the results, there is, in general, a satisfactory agreement between the percentage of oxygen in the upper explosion limit and that of the atmosphere remaining after the flames have been extinguished. Only in the case of carbon monoxide is there a deviation, unexplained up to now, and certainly not caused by the difference in the composition of the gaseous mixture surrounding the flame. It is certainly remarkable that a carbon monoxide flame, burning at constant pressure in a closed space, goes out when the percentage of oxygen is much higher than is the case with a hydrogen flame. The gases have the same molecular specific heat; and the calorific power per cubic foot is higher for carbon monoxide than for hydrogen, and, according to the calculations of Valerius, the temperature of the flame in air is also higher.

In connection with all that has preceded is a practical proposition by Harger for the prevention of fire and explosions in coal mines, by artificially keeping the quantity of oxygen in the air below a certain limit. The lowest and highest explosion limits for methane-air mixtures, being in the case of pure air 5·5 and 13 per cent., are, of course, modified when the proportion of oxygen falls. A raising of the lowest limit and a lowering of the highest limit are to be expected. Harger mentions only three of the many mixtures tested by him. In one consisting of 16 per cent. of oxygen, 84 per cent. of nitrogen, and 8 per cent. of methane a small flame of coal gas did not cause any ignition; nor was there one with a mixture of 83 per cent. of nitrogen, 17 per cent. of oxygen, and 8·5 per cent. of methane. But a mixture of 17·5 per cent. of oxygen, 82 per cent. of nitrogen, and 8·75 per cent. of methane proved to be just on the limit of combustion and non-combustion. Harger does not mention anything in regard to mixtures having a larger quantity of methane. His conclusion from these experiments is that when the proportion of oxygen is 17·5 per cent., the lowest and highest explosion limits coincide. This conclusion is rather inconsiderate. He has determined an explosion limit—*i.e.*, when the quantity of methane is

$$\frac{8{\cdot}75}{17{\cdot}5 + 82{\cdot}5 + 8{\cdot}75} = 8 \text{ per cent.}$$

the oxygen in this mixture is $17{\cdot}5\frac{100}{108{\cdot}75} = 16{\cdot}1$ per cent.

This is practically the quantity of oxygen in an atmosphere in which a methane flame extinguishes (15·6 per cent. according to Clowes, and 17·5 per cent. according to Harger), and also the quantity at the highest explosion limit, determined experimentally at 18·2 per cent.

That, therefore, the lowest and highest explosion limits just coincide when the amount of methane is 8 per cent. is, in my opinion, not at all certain, though probably they will not diverge very greatly. When the explosion limit and the corresponding percentage of oxygen are known, very great safety will certainly be attained by artificially keeping the percentage of oxygen in the atmosphere of the mine at this figure—about 17·5 per cent. previous to the addition of methane. But with air having a somewhat higher proportion of oxygen than 17·5 per cent. adequate safety may be possible, as the explosion limits converge obviously at a fast speed.

Physiologists (cited by Harger) have no objection to this lowering to 17·5 per cent. of the quantity of oxygen in the air; neither have they any to an increase in the proportion of carbon dioxide by about 1 per cent. Haldane (one of the specialists cited by Harger) advises illumination by means of acetylene lamps for mines in which the air has a diminished amount of oxygen. From the second of the tables already given it will be seen that the quantity of oxygen may fall to 12 per cent. before these lamps go out. Harger mentions also that the exhaust gases from a gas-engine or from a boiler furnace may be used to dilute the air, but only when they do not contain any carbon monoxide.

The hot gases are conducted through an "equilibrator"—an iron apparatus, the front part of which is packed with small pieces of a material made from a mixture of clay and a titanous iron ore or some other catalyzer, while the back part is packed with granulated copper or thin copper shavings. By the action of the catalyzer, the carbon monoxide is oxidized to carbonic acid if a sufficient quantity of oxygen is present. The excess of oxygen is afterwards taken up by the copper. If the passing gaseous mixture has too low an oxygen content, the copper oxide will cause the oxidation of the carbon monoxide. In this way Harger obtained mixtures of 81 to 81·5 per cent. of nitrogen and 19 to 18·5 per cent. of carbon dioxide. When mixed with air till the amount of oxygen falls to 17·5 per cent., calculation shows that the proportion of carbon dioxide rises to 3·2 per cent.; being considerably higher than Harger's physiological advisers allow as harmless. This means that Harger, who has not made this calculation, has to absorb a part of the carbonic acid from the exhaust gases before mixing them with the air serving for the ventilation of mines.

The following tables give the highest explosion limits and the amount of oxygen in the gas mixture remaining after the flame has been extinguished, as well as the amount in the extinguishing gas mixtures and at the highest explosion limit:—

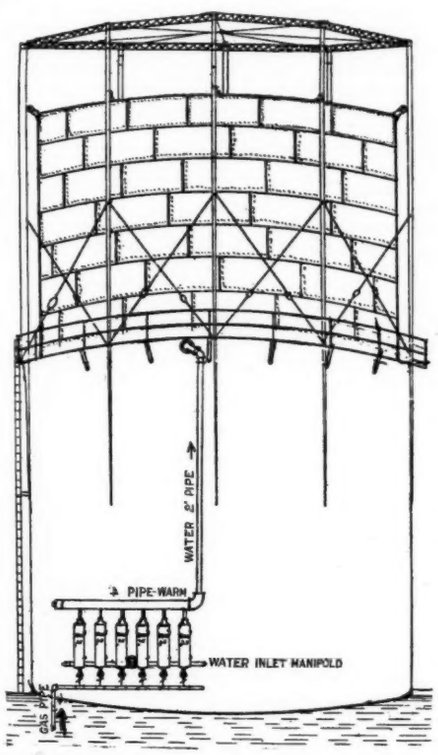
Author	Clowes.	Broockmann.	Roskowski.	Eitner.	Eitner.
Vessel	Cylinder.	Cylinder.	Bulb or 2·1 Cub. In. Capacity.	Tube or 0·8 In. Diameter.	Bulb of 1·76 Pints Capacity.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Hydrogen	72	75·0	64·85	66·40	75·5
Carbon monoxide	75	—	74·70	74·95	—
Methane	13	13·5	13·00	12·80	—
Ethylene	22	—	—	14·60	—
Acetylene	62	—	—	52·30	—

	Oxygen in the Gas Mixture after Flame has been Extinguished.	Oxygen in the Extinguishing Gas Mixture (O_2+N_2).	Oxygen at the Highest Explosion Limit.
	Per Cent.	Per Cent.	Per Cent.
Hydrogen	5·50	6·3	5·2 to 7·4
,,	7·50	—	—
Methane	15·60	17·4	18·2 to 18·3
,,	17·50	—	—
Ethylene	—	13·2	16·4 to 17·9
Carbon monoxide	13·35	15·1	5 3
Acetylene	9·50	—	8 0 to 10·0
Gasoline	16·40	—	20·0
Coal gas	11·50	—	12·6
,,	11·35	—	15·1
,,	—	—	17·0

HEATING WATER IN GASHOLDER TANKS.

The number of "The Gas Age" (New York) for the 15th ult. contained the following article upon the heating of water in gasholder tanks; the author being Mr. J. E. M'SWEENEY, of the Central New York Gas and Electric Company.

The engineers here have designed a clever scheme for keeping the gasholder from freezing during the winter months. It is working out far better than we expected, and is cheaper than a steam plant. The tank contains 3308 tons of water. Our gasholder, which is a single-lift of 100,000 cubic feet capacity, required last winter, for the first time, to be protected from freezing. The old gas plant having been abandoned, as all the gas is received by pipe-line, and all the machinery, boilers, &c., having been discarded, it was found that it would necessitate a large outlay to instal steam-plant for this holder. When the tank was erected, two 2-inch holes were drilled in the side, opposite each other, near the bottom, with the idea that we might try a heating system of this kind.



The accompanying illustration shows the method of installation. The 2-inch hole near the bottom of the tank is used to pass the water to the range of water-heaters shown. As this water becomes heated, it rises and passes through a 4-inch header or pipe directly above the heaters, and then through a 2-inch pipe to a point 3 inches below the surface of the water in the tank.

The illustration shows a range of six No. 25 Ruud gas water-heaters. On the opposite side of the tank there is another of the same kind, and half way between the two there is another range of three heaters, making fifteen in all. At first only eight of the heaters were used at one time, and in moderate weather not more than one in each range was lighted; and as the weather became colder enough were turned on to keep the water from freezing.

We find that it is necessary to cover with canvas the water exposed in the seal round the holder. Without this, the heaters are of little value, as the wind chills the water quickly.

This outfit is giving the very best satisfaction; it being, in our opinion, a cheaper and neater installation than any other we could instal. The consumption of gas can, of course, be stopped entirely on a warm day if desired.

TESTING AMERICAN GAS FOR LIGHTING POWER.

Suggested Adoption of the "Metropolitan" No. 2 Burner.

In the review of the proceedings at the last annual meeting of the American Gas Institute which appeared in the "JOURNAL" for Nov. 10, it was mentioned that one of the subjects which had been considered by the Manufacturing Section was the "Efficiency Relation Existing between Various Argand and Open-Flame Test-Burners." It came before them in the form of a paper by Mr. F. H. Gilpin, and the result was a recommendation to the new officers of the Institute for the adoption of the "Metropolitan" No. 2 argand as the standard test-burner. The Directors took the matter into consideration at a meeting held early in the year, as already noted [*ante*, p. 259]; but no decision was arrived at. It was intended to continue the discussion at the meeting to be held this month and in April, by which time it was thought the Public Relations Committee might have some recommendation to make. Meanwhile, the following memorandum on the subject has been received from the Director of the Bureau of Standards (Mr. S. W. Stratton).

The consideration which the Bureau of Standards has given to this subject during the past five years shows that a proper decision of this point should take account of the significance of gas candle power and the object of the candle power test as well as the characteristics of the burners which may be used. The following discussion is submitted to the Directors as bearing on these points.

It is customary to refer to gas as having a certain candle power, without any statement as to the conditions under which it must be burnt to get this value; and there seems to be a general impression that a given gas has a certain intrinsic candle power just as it has a definite heating value. This impression is, however, quite unjustified. The heat given out in burning a gas is the same, regardless of the character of the burner or the room conditions, assuming only complete combustion. That is to say, the heat of combustion of a gas of a given composition is a definite amount of heat which is actually given out when the gas is burnt, even though a test may not detect all of it. But the quantity of light yielded in a flame depends largely upon other factors than the quality of the gas itself, among which are the rate of burning the gas, the humidity of air, barometric pressure, and other factors, as well as the kind of burner used. In other words, the candle power of a gas must always be recognized only as a property of some indicated combination of gas and burner used under conditions more or less fully defined.

It is generally admitted that the only proper object of a candle-power specification for the quality of gas is the enforcement of such quality as will assure to a user of the open-flame gas suitable to give him a certain amount of light. In other words, the primary object of a candle-power rule is to afford protection to users of open-flame lights.

Though it may be perfectly fair to adopt any test-burner which it is desired to use, and then fix the requirement so that it is reasonably attainable commercially when testing with this burner, yet it is not practicable to secure a direct measurement of the usefulness of a gas for open-flame lighting except by testing the gas in an open-flame burner. Any test which will give the gas a higher candle-power rating than will the open-flame burner, tends to credit the gas with open-flame lighting quality in the minds of the consumers, and therefore is more or less objectionable as being misleading to these consumers.

In general, argand burners give a higher rating to gas than do high-grade open-flame burners. However, the mean spherical candle power as determined with an argand burner is usually about the same as that determined with an open-flame burner. In the case of the "Metropolitan" No. 2 burner, there would usually be obtained a slightly higher rating, even comparing mean spherical candle power, than is obtained with the best grades of open-flame burners. However, this advantage in mean spherical candle power is by no means so great as that ordinarily stated when considering mean horizontal candle power. A good illustration of the relative candle power given by testing gas with different burners is shown in the paper by Mr. C. O. Bond in the "Proceedings of the American Gas Institute," Vol. VI.* The results given there show that using the "Metropolitan" No. 2 burner, and taking the mean horizontal candle power, a higher value relative to the open-flame candle power is obtained than would be the case if the comparison between the "Metropolitan" No. 2 and the open-flame burner were made on the mean spherical candle power. In other words, in addition to any greater efficiency which the argand burner may have in mean spherical candle power, especially with the lower grades of gas, there is ascribed to gas from 5 to 10 per cent. greater lighting value because of the use of mean horizontal candle power. This shows why the use of any argand burner as a standard for gas-testing tends to be misleading, because indicating an advantage greater than the relative advantage in mean spherical candle power.

Especially it is to be noted that the candle-power in the lower hemisphere is much less in the argand than in the upper hemisphere. Even though this burner were a practical burner for domestic use, it would be undesirable in one respect—viz., that its light is not directed in the lower hemisphere as much as is

* See "JOURNAL," Vol. CXXI., p. 190.

desirable. This advantage of the argand relative to the open flame is comparable with the disadvantage of the upright in comparison with the inverted mantle. The light in the latter is more desirably distributed.

It is commonly claimed that it is desirable to use, in the determination of the candle power of gas, "the burner which will give nearest to the true candle power of gas." However, as has been pointed out, there is no such thing as true candle power of gas. We are no nearer to a true candle power determination with one burner than with another. If it is desired to utilize the burner which will give to the gas the maximum rating—in other words, that which will credit the gas with the maximum amount of light intensity which is obtainable when burning the gas at the given rate (usually 5 cubic feet per hour)—then a necessary and logical conclusion from this is that one must use the most efficient type of mantle burner for the testing, since such mantle burner is the only one giving the maximum light efficiency from the gas. To stop at some intermediate point—as, for example, to select an argand burner—cannot be justified by any such argument.

For those places where a candle-power specification is necessary in order to afford protection to users of open-flame lights, the Bureau believes that an open-flame burner should be used in testing the candle power of gas. Such places are rapidly decreasing in number; and it is not improbable that in the very near future the candle-power requirement can be almost altogether superseded by a heating-value requirement. Indeed, at the present time candle-power determinations are being made more and more for the purpose of testing the efficiency of lighting installations or the performance of appliances than for testing the quality of the gas itself.

It appears to the Bureau that any official action which might be taken looking to the adoption of a standard test-burner would operate to delay this progress towards the adoption of heating-value standards, rather than to encourage it. It is therefore suggested that this effect of such action by the Institute be carefully considered, as perhaps being more important than any other factor in determining the advisability of action on this point.

If it seems advisable to adopt some standard burner by an act of the Institute, the Bureau would be pleased to have careful consideration given to the points mentioned, in the hope that the policy of the Bureau might be confirmed by the action of the Institute, so that the recommendations of the two would be in harmony on this point.

EXTRACTING WATER FROM WATER-GAS TAR.

The "American Gas Institute News" for last month (March) contains two answers to the following questions on the above-named subject: "In the manufacture of water gas in a 4-feet set, where the machines are operated only 10 hours out of 24, and where coke and mid-continent gas oil are used in the manufacture, we find that we are making a very heavy tar, and apparently no lampblack. This tar is passed out into a wooden box with partitions, which acts as a separator. We find that it is impossible to separate the tar from the water. We should like to know whether or not there is any mechanical method of separating this tar, or any other method, in order that the tar may be used for burning purposes."

The first answer was by Mr. F. J. Ikena, of Albany (N.Y.), and it was as follows: "My experience has been that the relief holder is the best final tar-separator. During the constant travel up and down of the holder, the water from the tar seems to adhere to the holder and stay on top of the tar on re-immersion. Our tar for 1914 tested an average of 1·1 per cent. of water; the maximum showing 3 per cent. and the minimum a trace. Our box separator performs its function in about the following manner:

	Water. Per Cent.	Oils. Per Cent.	Residue. Per Cent.
Sample after pumping 3 minutes	2 ..	5·00 ..	93·00
15 minutes	5 ..	6·25 ..	88·75
40 minutes	13 ..	7·50 ..	79·50

What remains above 350° Fahr. is called residue. Our method of handling is to use quarter points on the pit circumference, which we will call A, B, C, and D. A and B are opposite to C and D. Discharge tar for final separation at A on top of water. Draw tar for use or shipment from C at the bottom of the holder. When tar shows excessive water at C, draw from A and discharge from box separator to C. This reversal will allow time for separation and settlement. Our method of quickly ascertaining excessive water content is by putting a few drops of tar on the steam end of the pump, which almost immediately begins to sizzle if any water is present."

The second answer was by Mr. H. C. Palmer, of Buffalo (N.Y.): "In separating water from water-gas tar, heat is very useful. It has been found that tar and water which cannot be separated in a separator can be in a tank, where the liquid is at rest and heated by a steam-coil. The time required may vary from a few hours to two or three days; but the result is usually attained in the end. Frequently these emulsions are caused by small quantities of lampblack, the grains of which are very hard to see, but are the nuclei of globules of oil that are not easily separated from water."

AMMONIUM CHLORIDE AS A GAS-WORKS BYE-PRODUCT.

In a recent issue of the "JOURNAL" [*ante*, p. 195], brief reference was made to an article by Herr W. STROMMENGER, in the "Zeitschrift für angewandte Chemie," dealing with the production of ammonium chloride in gas-works, coke-ovens, &c. The following are some additional particulars on the subject.

Among the bye-products resulting from the distillation of coal—ammonia, benzol, tar, and gas—ammonia is the most important, if not as regards quality, at least for its commercial value. With some few exceptions, it is converted into sulphate, owing to there being a ready sale for this product as a fertilizer. The processes for the manufacture of sulphate can be classed in three groups: (1) The indirect process (distillation of the ammonia in ammoniacal liquor); (2) the semi-direct process, with partial distillation of ammonia; and (3) the direct process, without distillation. In all these processes the condensed products, containing almost exclusively salts of ammonia, are to a certain extent lost. As these products can be distilled or sent directly to the saturator, they cause greater expense, and complicate somewhat the recovery of sulphate in the first case, while in the second they lead to complaints, which, though proved to be inaccurate, are vexatious.

The composition of the condensed products is extremely complex, as they are constituted of organic and inorganic compounds. The ammonia compounds, which are here of chief interest, consist mainly of ammonium chloride; and hence arose the idea of utilizing these products to obtain pure ammonium chloride, which is of considerable commercial value. The subsequent investigations were crowned with perfect success, and Herr Strommenger was able to obtain ammonium salt which was absolutely exceptional from the point of view both of purity and colour.

Work varies according to the composition of the liquor. The treatment should in all cases contribute to enrich the liquor in ammonium chloride. Decomposition and composition into chloride of the other ammonia compounds should be complete, and the organic parts removed. Complete elimination of iron is of special importance, as this constituent depreciates the value of the final product. It exists in the liquor chiefly as iron protoxide, and in this form it cannot be removed from the ammonia. Consequently it must first be oxidized. This can be done in various ways; and air, in particular, has been found favourable, in certain conditions.

Condensed products from gas at a higher temperature are more suitable for the formation of ammonia salts not containing volatile ammonia, as, for example, the condensed products in the direct process before separation of the tar, and in the semi-direct and indirect processes up to the first air condenser. The liquor which when fresh is light yellow, quickly turns brown and black in the air; it contains about 200 grammes of salts per litre. This liquor is heated and mixed with hydrochloric acid somewhat in excess, so as to convert the mixed ammonia salts into ammonium chloride. Thus it grows turbid from the sulphur separated. At this point it is heated while air is bubbled through, which accelerates decomposition and oxidation of the iron until the solution, which has again become light yellow, has grown quite clear, and the sulphur is separated.

The sufficiently pure sulphur is filtered, and the ammonia in excess is added to the still hot liquor, to eliminate iron and other impurities. The liquor is again boiled, and then allowed to rest until a precipitate is produced which is removed by filtration. The excess of ammonia is neutralized with hydrochloric acid, and then, to transform into chloride the sulphate of ammonia which was not decomposed by the hydrochloric acid, common salt is added. Transformation takes place according to the equation—

$$2NaCl + (NH_4)_2SO_4 = Na_2SO_4 + 2NH_4Cl.$$

Then all the salts of ammonia contained in the liquor are transformed into ammonium chloride; but there still remain sodium chloride, sodium sulphate, and certain undecomposed organic substances.

The liquor is evaporated to dryness; thus obtaining, according to the composition of the original liquor, salts of a light brown colour, rose red, violet, and up to dark brown, owing to the presence of undecomposed organic compounds, which, even in the direct process, produce coloration of the salts in the saturator.

The ammonium chloride is again heated until there is no more steam, and then subjected to sublimation. Three fractions are collected in three parts of the apparatus: (1) The common salt and sodium sulphate remain on the bottom, with a considerable amount of very fine particles of carbon from decomposition, by heat, of the volatile organic substances; (2) pure ammonium chloride is deposited in the top; and (3) there is also ammonium chloride, with impurities from volatile organic substances, in the still. The ammonium chloride near the top, which represents from 90 to 95 per cent. of the chloride contained in the salt before sublimation, is still impure, through traces of products resulting from the decomposition of organic matter, which, though of no consequence in analysis, cause the salt to turn brown in the air and light.

By crystallization a salt is obtained which contains 100 per cent. of ammonium chloride; and its snow-white colour remains unchanged. Thus the product meets the strictest requirements.

The chloride in the still is also purified by crystallization, though it can again be put with the original dry salt from sublimation. The carbon on the bottom and also the previously collected sulphur form a bye-product of some value.

The formation of the pure ammonium salt by the process in question is, according to Herr Strommenger, easy of introduction into gas-works; the plant being simple and convenient. As the manufacture of sulphate by the separation of the condensed products, preferably fixed, presents great advantages—for example, in the semi-direct and indirect processes there is economy of lime and an easier emission of ammonia in distillation, besides a saving of steam—it is to be noted that it can be readily produced in large quantities. In all localities where foundry coke is manufactured it will be remunerative to convert into salts of ammonia the condensed products which can now be condensed in coke-works.

CONTINUOUS PRODUCTION OF WATER GAS.

The Société Française d'Exploitation de Fours Spéciaux à Haute Température, in association with M. Antoine Verzier, have taken out a patent for France [No. 473,149 of 1914] for apparatus for the continuous production of water gas. The patentees claim that their plant makes it possible to vaporize water contained in a chamber in the ash-box and also superheat the steam produced at a constant temperature by mere radiation, during its passage

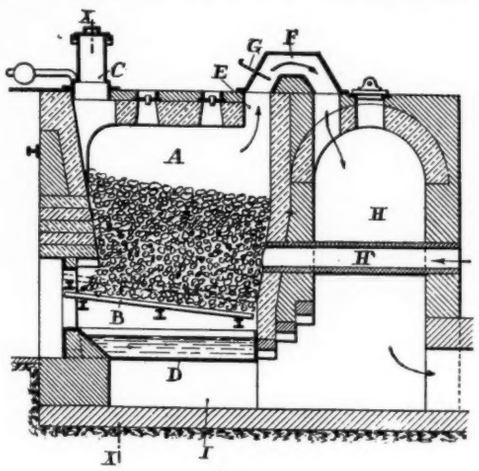


Fig. 1.

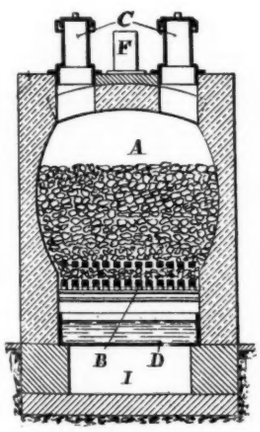


Fig. 2.

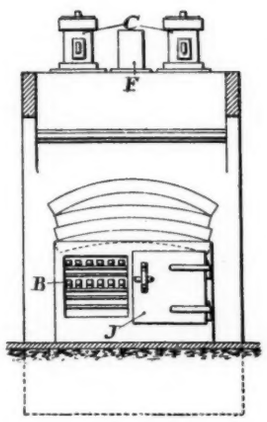


Fig. 3.

under pressure in the collector, from the combustion substances provided by the gasifying plant itself—thus dispensing with a separate boiler. They also claim that they can obtain, as required (by conveying the excess of superheated steam, produced as already explained, through the incandescent layer of fuel), decomposition of the steam; the necessary quantity of air being supplied by a fire-clay pipe which runs across the collector, and the air being superheated before being brought into contact with the fuel. Apparatus thus constructed obviates the period of transition due to the introduction of cold air to complete the reaction.

A form of plant constructed according to this invention is shown in the accompanying illustrations; fig. 1 being a longitudinal section, fig. 2 a section on the line X, and fig. 3 a front view.

The plant comprises a combustion chamber A, into which the fuel, resting on the grate B, is introduced by charging-boxes C. Below the fuel is a chamber D, always full of water. The gas liberated by the incandescent fuel issues from the chamber A through a channel E, and then passes into a pipe G provided with a damper, by which it is conveyed into a collector H, communicating with a compartment I, under D, which is thus heated by simple radiation from the hot gases coming from the fuel in the collector and the compartment I. Doors J (fig. 3) hermetically close the front of the ash-box and chamber, and the latter also closes the compartment I. The fire-clay pipe H^1 conveys hot air to the fuel.

The working of the plant can be easily understood. The water in the chamber is continually and naturally converted into steam, which is automatically superheated in passing through the incandescent fuel above, where the oxygen and hydrogen are separated, as previously described. The chamber D, in the ash-box, may be of any suitable shape favouring the evaporation of water.

PRODUCTION OF METHANE.

Reference has already been made in the "JOURNAL" to the process devised by M. Léo Vignon for the production of methane in a gaseous mixture, like water gas, by the action of steam in the presence of lime. He has taken out patents for his process, and lately made an addition to No. 469,907 of 1914 [see *ante*, p. 78], the nature of which is indicated below.

In the specification of the previous patent, it was noted that hydrocarbons, chiefly methane, are produced at the expense of carbon monoxide in a gaseous mixture like water gas when the latter is run over lime, after being mixed with steam, at a temperature of 350° to 1200° C. The object of the addition is to point out that, as the applicant has since observed, the same reaction occurs with other substances playing the part of catalyzers, as does lime above 900° C. The proportions of methane obtained are variable according to the substances employed, which themselves may be very numerous.

Experiments were made with several substances. Water gas, previously humidified by being passed through hot water, was run into a porcelain tube containing about 100 grammes of the substances, and heated to a high temperature, which was greatly varied in the different experiments. Some of the results obtained are given below; the experiment which yielded the highest per centage of methane being indicated in each case. The water gas utilized contained 48·7 per cent. of carbon monoxide and 51·3 per cent. of hydrogen. This gas was passed through water heated to 95° C. before being conveyed over the catalyzer at the speed of about 4 litres (0·14 cubic foot) per hour.

—	Iron Filings.	Copper Turnings.	Silica (Precipitated).	Magnesia (Calcined).	Alumina (Calcined Hydrate).
	800° C.	1050° C.	900° C.	550° C.	1200° C.
Carbon monoxide .	34·5	27·6	45·6	47·0	23·2
Methane . . .	3·9	4·3	4·3	3·3	3·6
Hydrogen . . .	61·6	68·1	50·8	49·7	73·2

It would be possible to mention many other simple or compound substances giving similar reactions.

The Late Colonel Sir Alfred Somerset.

Writing in reference to his late Chairman (whose death was reported in last week's "JOURNAL"), Mr. C. W. Offord—the General Manager of the Enfield Gas Company, up to the time of its absorption in the Tottenham Company at the end of the year before last—writes: Colonel Sir A. P. Somerset, K.C.B., has not survived for long the termination of the life of the Enfield Gas Company as an independent undertaking. Sir Alfred had been in failing health for some three or four months past, and died at Enfield Court on the 26th ult., at the ripe age of 86 years. His connection with the Enfield Gas Company extended over many years. He was first elected to the Board in the year 1861; and from that time until December, 1913, when the amalgamation referred to took place, served continuously in the direction of its affairs—being Chairman of the Board from the year 1880. Those who saw him in August last, when he kindly lent his riding-house for the reception following the marriage of my daughter, will have very pleasurable remembrances of the genial interest that he and Lady Somerset showed in the proceedings, and of the apparent pleasure it gave them to conduct the visitors over the house and gardens. Sir Alfred was the only son of Lord John Somerset who commanded the heavy Cavalry at Waterloo, and a grandson of the seventh Duke of Beaufort. He was a keen member of the Coaching and Four-in-Hand Clubs; was for many years Master of the Enfield Chase Stag Hounds; and ever took a kindly interest in all that was calculated to benefit the community in which he had lived so long.

London and Southern Junior Gas Association.—Next Saturday members of the Association will visit the works of the Hornsey Gas Company; and on the 30th inst. a meeting will be held at the Westminster Technical Institute, when Mr. J. G. Clark will read a paper entitled "Some Horizons of the Gas Industry." The annual general business meeting of the Association is fixed for Friday, May 1

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Water-Heating by Electricity.

SIR,—In perusing the "Electricity Supply Memoranda" in your issue of the 30th, I find that the writer grossly misrepresents my statement as to water heating made during the discussion on Mr. Cooper's paper at the Institution of Electrical Engineers.

Moreover, your writer casts aspersions upon the cleanliness of myself and members of my family, which appear to me to be in very bad taste.

What I actually said was that the electric-heater has a cubical capacity equal to 12 gallons; but it is equal to an output of over 60 gallons of water per day at 100° Fahr., which, I think you will agree, is a fair supply for a small household. It is found sufficient for two or three baths per day, in addition to the ordinary kitchen requirements.

I have facilities for the production of ten times this amount of hot water if necessary; but the output of the electric-heater is found ample for ordinary everyday demands.

I hope you will do me the justice to have this matter put right in your next issue.

GEO. WILKINSON.

Harrogate, March 31, 1915.

[Mr. Wilkinson is at once uncharitable and thin-skinned. He says that the writer of "Electricity Supply Memoranda" has "grossly misrepresented" his statement as to water heating. What did the writer say: Mr. Wilkinson "mentioned that he heats up 12 gallons of water to 180° Fahr., on an average consumption per day of 12·8 units of electricity." Our correspondent asserts that what he actually said is that "the electric-heater has a cubical capacity equal to 12 gallons; but it is equal to an output of over 60 gallons of water per day at 100° Fahr." Three reports of Mr. Wilkinson's remarks published in the electrical papers are as follows:

> "ELECTRICIAN": "The apparatus for the latter purpose had a capacity of 12 gallons, and was thermostatically controlled. the electrical supply being knocked off at 180° Fahr. . . ; There were six persons in family. . . . The consumption of energy for the twelve months ending 1914 had averaged 12·8 units per day."

Nothing there about over 60 gallons at 100° Fahr.

> "ELECTRICAL REVIEW": "He now used a 12-gallon electric-heater thermostatically controlled, which gave a supply of hot water at 180° Fahr. night and day. . . . This was for a family of six; and it required 12·8 units per day."

Nothing there about over 60 gallons at 100° Fahr.

> "ELECTRICAL TIMES": "In his household of six persons, he had installed a 12-gallon 1 KW. water-heater, thermostatically controlled, that delivered water to the outlet taps at 100° Fahr."

Nothing there about over 60 gallons at 100° Fahr. Now what does Mr. Wilkinson mean about the writer of "Electricity Supply Memoranda" having "grossly misrepresented" him. If there has been misrepresentation, it is either on the part of our correspondent himself, or in the reports of the electrical papers. Which is it? If the latter, Mr. Wilkinson has not troubled to publish in their columns a correcting letter. In the discussion, Mr. Wordingham was also impressed by the 12-gallon supply, and said nothing about a 60-gallon supply. We should be very sorry to cast aspersions upon Mr. Wilkinson or his family from the point of view of cleanliness. Our "aspersions" (if this is the correct term to use) were levelled at the adequacy of the 12-gallon water-heater. There are two clear facts in the reported remarks of our correspondent—one is that the heater was a 12-gallon 1 KW. one, and that the thermostat was set for 180° Fahr., and not 100°. Starting cold, and (to be kind) assuming 100 per cent. efficiency, and taking the initial temperature of water at 50° Fahr., Mr. Wilkinson's 120 lbs. of water would require 15,600 B.Th.U. to raise it a further 130°. With an input of 3420 B.Th.U. per hour, for the 12 gallons to arrive at 180°, four-and-a-half hours would be absorbed. When Mr. Wilkinson empties his 12 gallons into a bath, four-and-a-half hours must elapse before any other member of his family can get 12 gallons of water at that temperature. If the thermostat is set for 100° Fahr. at 1 KW. per hour, it would take nearly two hours to heat-up; and what would be the good of the 12 gallons in a full-sized bath? These figures assume that no water is withdrawn for other purposes. We prefer not to be pestered with such inconvenience, and have, the same as Mr. Wordingham, a liking for an unlimited supply for domestic purposes. If there is anything amiss with our figures, we shall be pleased to hear again from Mr. Wilkinson; but meantime his charge of "gross misrepresentation," in view of the uncorrected reports in three electrical papers, appears to us to be "in very bad taste."—ED. J.G.L.]

Factory Lighting.

A correspondent in the Cheshire district puts this query: "We have in this town a printing works; and the manager is desirous of improving the light in the bleach croft of the works. The bleach croft is very steamy; and the fumes given off consist of hydrochloric acid gas, chlorine gas, and sulphuretted hydrogen gas. The lighting at present is done by flat-flame burners; and I want to know of a lamp which will stand the above conditions and give satisfactory results. A copper lamp seems out of the question; but I would like to hear others' views on the matter." [Perhaps some reader will kindly oblige.—ED. J.G.L.]

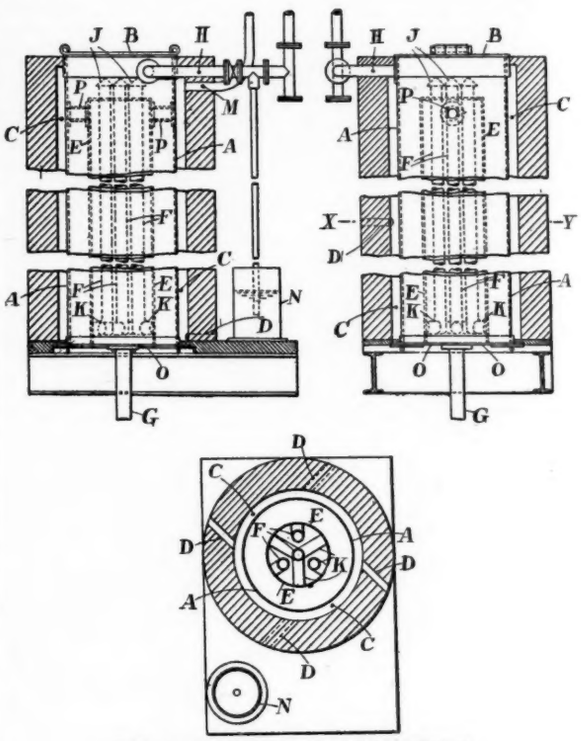
REGISTER OF PATENTS.

Vertical Coking Retorts or Carbonizing Chambers.

COCHRANE, B., of Hurworth, near Darlington, and PEEL, R., of Neville's Cross, near Durham.

No. 3886; Feb. 14, 1914.

This coking retort or carbonizing chamber is provided with an inner cylinder or tube, imperforate (except at the base), wherein are arranged a number of smaller tubes connected to, or in communication with, a suction main at the top leading to an exhauster, and opening at the bottom into (or connected by branches to) the space containing the coal to be carbonized. The inner tube may be partially or wholly filled, around the smaller tubes therein, with any suitable heat-retaining material.



Cochrane and Peel's Vertical Coking Retorts.

The illustrations show elevations of the plant at right angles to each other, and a sectional plan on the line X Y.

The vertical cylindrical chamber A (of cast iron or other suitable material) is provided with a hinged cover B and arranged centrally of an annular brick flue C, into which open gas supply pipes or nozzles D, so arranged as to uniformly heat the retort. The nozzles, arranged near the centre and bottom of the flue, preferably open more or less tangentially into it, so as to cause the flame from them to encircle the retort. Centrally within the retort is mounted a cylinder or tube E, wherein are a number of smaller gas collecting tubes F. The cylinder E is supported by a metal column G, and its gas collecting tubes F may preferably be carried by brackets across the top of the retort. The pipes F open at the top into the usual gas space. H is the suction main leading to an exhauster. Caps J are provided over the ends of the pipes to prevent coal getting into them when charging the retort. The pipes are connected near the bottom (by branches K) to the lower portion of the retort, so that gas evolved near the bottom of the retort passes up the tubes to the space above, whence it is drawn away by the suction main H. M is the outlet from the flue. N is a liquid seal.

The retort is charged from the top to within a suitable distance of the cover B; and the carbonized fuel is discharged by sliding or hinged doors O at the bottom. The internal gas collecting tubes F permit of the ready flow of the gases from the bottom of the chamber; and, carbonization being at a comparatively low temperature, "dissociation of the gases is avoided." The gases from the upper portion of the chamber rise into the gas space and are drawn off by the suction main H.

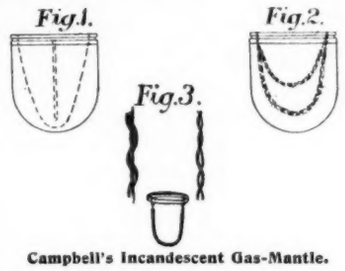
Any suitable heat-retaining material (such as fragments of fire-brick) may be provided in the central cylinder E around the gas collecting tubes F. The heat-retaining material within the cylinder E acts as a regenerator, and assists "in the maintenance of a uniform temperature during carbonization." It also prevents undue cooling of the retort during charging and discharging.

Incandescent Mantles.

CAMPBELL, F. W., of Bangor, co. Down.

No. 4552; Feb. 21, 1914.

This invention relates to the form of incandescent mantles described in patent No. 28,258, of 1913, and has for its object "to provide an internal incandescent filament in the interior of the mantle of the necessary strength and brilliance by plaiting or loosely twisting the incandescent thread or threads of which the filament is composed, instead of using a single-thread filament of the usual twist or one or more single threads side by side."



Campbell's Incandescent Gas-Mantle.

Figs. 1 and 2 show how the filaments may be arranged in the mantle; and fig. 3 shows the filaments with asbestos reinforcement.

With internal incandescent filaments, as described, "a through and through incandescence is easily produced therein, and no shadow effects result to depreciate the incandescence of the mantle proper whether the filament takes the form of chain-like festoons or lines running in any direction or any other desired shape." Asbestos or other suitable material may be used if desired as a reinforcement for giving additional strength to the filament, and may be introduced (as shown in fig. 3) as a filament of a chenille or like formation preferably secured to, or suspended from, the mantle ring.

Automatic Apparatus for Lighting and Extinguishing Gas-Lamps at Determined Times.

NOVITAS, FABRIK ELEKTRISCHER APPARATE, A. G., of Zürich, Switzerland.

No. 6159; March 11, 1914. Convention date, July 25, 1913.

This automatic apparatus comprises a clockwork chamber and a gas chamber and at least one device for shutting-off the gas, operated by the clockwork, and a chamber filled with a packing material, arranged between the clockwork chamber and the gas chamber, and through whose walls a finely screw-threaded pin is screwed. The pin is in connection with the clockwork in the clockwork chamber, and in connection with the shutting-off device in the gas chamber, with the object of forming a gas-tight closure between the gas chamber and the clockwork chamber by means of the packing material and the fine thread pin, which latter is easily rotated.

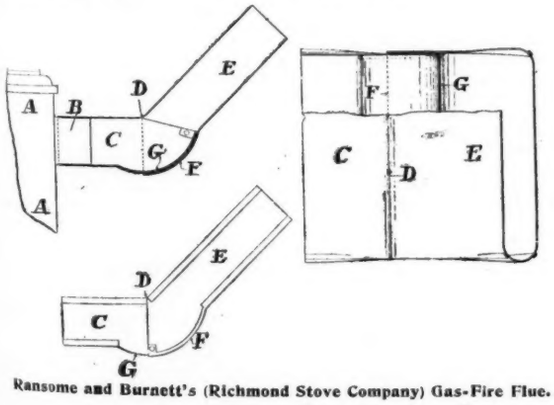
The gas-tight joint between the gas chamber and the clockwork chamber, and the easy rotation of the parts transmitting motion from the clockwork chamber to the valves in the gas chamber, has the result that the motive power (the clockwork) for actuating the parts may be comparatively small. The dimensions of the entire apparatus are small; so that the whole of it may be arranged in the interior of the lamp, so as to be better protected than if it is outside, as in some known automatic lighting and extinguishing apparatus.

Flues for Gas-Fires.

RICHMOND GAS STOVE AND METER COMPANY, LIMITED, and RANSOME, J. A., of Warrington, and BURNETT, J. R., of Appleton, Lancs.

No. 10,757; May 1, 1914.

This invention has reference to adjustable gas-tight bends with overlapping segmental parts, for conveying away the products of combustion from gas fires or stoves into a chimney or flue.



Ransome and Burnett's (Richmond Stove Company) Gas-Fire Flue.

The invention is illustrated in sectional side elevation, outside elevation, and plan (partly in section).

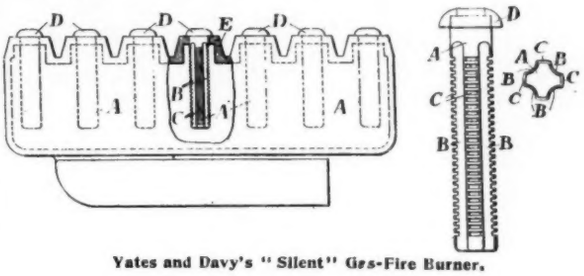
A is part of a gas-stove, with part of the conduit fitted over the discharge branch B on the back. In general form, the conduit is rectangular, with semicircular or curved sides at its ends—wide relatively to its depth. The roof of the conduit is in one piece, but the sides and bottom are in separate parts, which overlap "at and about the point that one part of the conduit is adapted to move in relation to the other." Part C has projecting side cheeks; and its bottom plate (extended to the extreme edge of the cheeks) is in the form of a sector of a circle having as its centre the point or line D, along which the top plate is adapted to bend. The part E, similarly, has its sides extended to form cheeks, which lie outside the cheeks of the part C, and overlap them. The bottom plate of the part E is at the centre or inner part curved at F in the form of a sector of a circle, having its centre at the part or line D and lying just outside the concave part G, with which it will make sliding contact. The degree of overlap of the parts is large, as shown, so that, even when the outer part E is bent at right angles to the part C, the over-lapping portions will still have a considerable amount of contact with one another, and a good gas joint be formed.

Gas-Burners.

YATES, H. JAMES, and DAVY, J. F., of Aston, Birmingham.

No. 10,861; May 2, 1914.

This invention relates to gas-burners employed in various forms of heating apparatus—more especially in conjunction with gas-fires. The object aimed at is to "ensure silent burning of the gas before reaching the nozzle" by using a solid drawn tube having longitudinal grooves or depressions formed in it with the parts between the depressions perforated by transverse slots.



Yates and Davy's "Silent" Gas-Fire Burner.

The illustration shows a part sectional front elevation of the gas-fire burner fitted with nozzle tubes; also a side elevation and sectional plan of the combined nozzle and perforated tube to a larger scale.

The solid drawn brass tube A, having the lower end closed, is formed with any convenient number of longitudinal grooves or depressions B. The parts between the depressions are perforated with a number of fine transverse slots C (parallel to each other) produced by means of thin saws. At the outer end the tube is a head or nozzle D by which the tube is supported in the main part E of the burner. The tubes are of small diameter and relatively long. A ratio of five to one between the length and the diameter is suggested. For the burners employed with gas-fires a diameter of about 7-16th inch is convenient; but this also may be varied considerably. The tubes are simply dropped into the open ends of the apertures in the part E and supported by the abutment of the heads or nozzles on the upper side.

By means of perforated tubes as described, it is claimed that the mechanical and constructional disadvantages of flat or cylindrical gauze diaphragms which have previously been employed are avoided.

Controlling Gas-Retort Charging and Discharging Operations.

CARPENTER, H. A., and WARNER, A. W., of Sewickley, and the RITER-CONLEY MANUFACTURING COMPANY, of Pittsburgh, U.S.A.

No. 20,200; Sept. 25, 1914.

The specification points out that manipulations of gas-making retorts (such as charging and discharging) which involve the opening and closing of the retort at its front and rear ends necessitate co-operation of the attendants at opposite ends of the bench. The manipulations are usually carried out at the front or charging end; and for charging and discharging, which are ordinarily accomplished by one and the same inward movement of a scoop or charging tool, it is necessary to open or clear the rear end. Under the present practice accidents are not uncommon—due to the entering movement of the tool before the rear end has been opened, or before the rear operative is out of the way—resulting in damage to the apparatus, or injury to the workman, or both, "depending on the conditions existing when a premature operation takes place."

The primary object of the present invention is to forestall accident by controlling the retort-entering movement of the tool at both ends of the retort instead of only the front end, rendering it impossible for the tool to advance, even though everything is in readiness at the front end, until the operator at the rear end has actuated a controlling device, the movement of which is necessary before the tool can advance. The necessary rear end adjustment may be accomplished with the operator out of range of the retort before the requisite adjustments have been made at the front end, in which case the "setting" of the rear controller will not alone accomplish the forward movement—the mechanism remaining inactive until the front controller is also set. Conversely, the "setting" of the front controller will have no effect until the rear controller has been set. Thus, the controllers co-operate, and are dependent on each other for accomplishing the advancing movement of the tool, and so preventing premature operation.

The invention embodies an electric circuit which controls the tool-operating motor, with controllers in the circuit at both the charging

and discharging ends of the retort; both controllers being necessarily thrown or set before the motor can advance the tool. Provision is also made for automatically releasing the controllers, so that they may return to normal position after the tool has started on its forward movement.

The retort entering tool is ordinarily carried by the charging machine, which moves on a track along the front of a bench for operating on different retorts; and at the rear or discharge end a similarly movable gas-producer charger is employed for delivering coke from the retorts into the producers. The retort charger at one side of the bench and the producer charger at the opposite side are each motor driven, and a further purpose of the present invention is to render the motors inoperative when the controllers are in set position. This is desirable for the producer charger, as thereby, after having been properly positioned relatively to a retort, the position cannot be disturbed prior to entering the tool in the retort. And with the controller in set position at the discharge end of the retort, the producer charger cannot be moved—the operator at such end "thereby necessarily knowing that a tool operation is impending and avoiding premature or untimely movement of the producer charger."

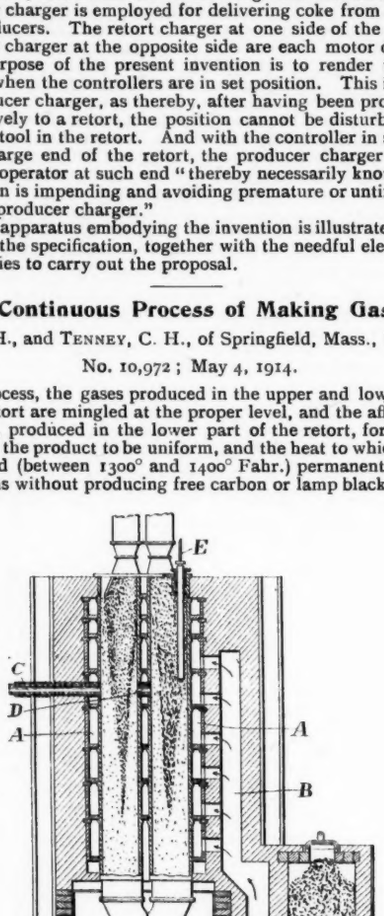
A form of apparatus embodying the invention is illustrated diagrammatically in the specification, together with the needful electric motor and accessories to carry out the proposal.

A Continuous Process of Making Gas.

BURGI, H., and TENNEY, C. H., of Springfield, Mass., U.S.A.

No. 10,972; May 4, 1914.

In this process, the gases produced in the upper and lower parts of a vertical retort are mingled at the proper level, and the affinity of the leaner gases, produced in the lower part of the retort, for the richer gases causes the product to be uniform, and the heat to which the gases are subjected (between 1300° and 1400° Fahr.) permanently fixes the hydrocarbons without producing free carbon or lamp black.



Burgi and Tenney's Continuous Gas-Making Plant.

In the accompanying vertical section of apparatus for carrying out the process, there are shown two vertical retorts with, at their upper ends, the usual coal-feeding apparatus of any suitable construction; while the lower ends are provided with mechanism for withdrawing the coke produced. The retorts are surrounded by flame passages A, which are supplied from the flue B, which receives gas from an outside producer of any suitable type. The flues B feed into the flame passages A around the retorts through openings, and are controlled in the usual way by dampers or baffle-bricks, "by means of which the heat is kept constant within certain limits at all points around the retorts, and by which it is possible to maintain the desired temperature in the zone before referred to, where the gas is taken from the retort and where the oils are disintegrated or cracked-up and fixed in the gas."

At an intermediate point in the left-hand retort is arranged a gas exit pipe C, communicating with the retort "at a point where the temperature is proper for fixing the gases produced in the upper part of the retort without causing the gases to be burned, and thereby produce free carbon or lamp black." A pipe D, arranged at substantially the same level as C, establishes communication between the two retorts, so that the gases produced in both retorts may be withdrawn through the one pipe if desired.

For the purpose of supplying enriching light oils to the coal, so as to improve the illuminating power of the gas produced, a pipe E extends downwardly on the interior of one of the retorts from the top to a point where the temperature is proper for cracking-up and permanently fixing the gases derived from the enriching oils. This point will usually be substantially in the region or zone of the pipe C, but removed from, or on the opposite side of, the retort from the outlet pipe. The pipe is preferably jacketed to prevent it being burned-off. The pipe extends through the coal, and oils are fed into the upper end; and as they pass through the pipe they are gradually heated, and "when finally introduced into the body of the coal are at the proper temperature for being readily cracked-up."

In operation the gases distilled from the coal in the upper part of the retorts are mingled with those produced in the lower part, and subjected to the heat in the region of the exit pipe C, which is "fixed at some point on the retort where it is possible to maintain a temperature just right for permanently fixing the gases without producing free carbon or lamp black." The pipe E, for introducing enriching oils, may be dispensed with wherever the gas produced from the coal has the requisite illuminating power.

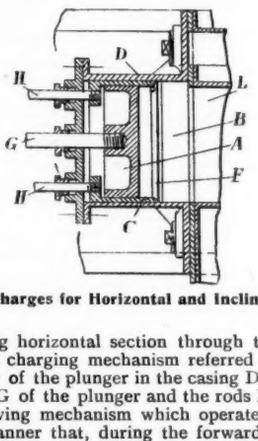
As indicated, the outer portion of the moving body of coal in the retort is first distilled, and more highly heated than the central portion or crater; and the gases which are derived from the central crater are compelled to pass through the more highly heated coal, in order to reach the exit pipe; and since the different levels or zones of the retort are maintained at varying temperatures, the gases cannot pass into this pipe until they have passed through the zone where the temperature maintained is best suited for fixing the illuminants, light oils, &c., into the gas.

Charging Horizontal or Inclined Retorts.

DUCKHAM, A. M'D., of Ashtead, Surrey.

No. 13,936; June 9, 1914.

In charging a horizontal or an inclined retort, the patentee points out, there is sometimes used a plunger which reciprocates in line with the retort across a shoot containing the material to be carbonized and situated in front of the mouth of the retort. In its movement towards the retort, the plunger pushes the material into the latter; while during the return movement of the plunger, material descends the shoot to fill the space left by the plunger. This mechanism is, he says, unsatisfactory, as it is liable to jam. For avoiding this defect his invention provides the plunger with a sleeve, preferably having a cutting edge; the sleeve being moved through the material in advance of the plunger—thus enclosing a core of material which is subsequently pushed by the plunger into the retort. Where a number of retorts set one above the other are to be served by a shoot common to them all, there is provided a plunger and sleeve corresponding with each retort—all being operated by the same driving mechanism, so arranged that the sleeves have the necessary movement in advance of the plungers.



Duckham's Charges for Horizontal and Inclined Retorts.

The accompanying horizontal section through the plunger A and shoot B shows the charging mechanism referred to. The sleeve C slides independently of the plunger in the casing D, and has a cutting edge F. The rod G of the plunger and the rods H of the sleeve are connected with driving mechanism which operates the plunger and sleeve in such a manner that, during the forward stroke, the sleeve moves more slowly than the plunger; but, being in advance of the latter throughout the stroke, it cuts through the column of coal in the shoot. At the end of the stroke the plunger has caught up the sleeve, and the coal enclosed by the sleeve has been pushed into the retort I.

Gas and Air Burning Burners.

FENNEL, J. W., of Newburgh, New York.

No. 9890; April 21, 1914.

This invention relates more particularly to mixers for gas and air burning burners of the type which have air and (or) gas supply means, or both, automatically controlled by the pressure of the gas in the supply pipe, by means of a reciprocatory or vibratory member controlled by the pressure of the gas; the gas inlet being controlled by a valve in the mixing-chamber and the air supply by a shutter or equivalent, and the action of the shutter or the valve and shutter being controlled by the vibratory member.

One object of the invention is "to provide simple and efficient means for admitting air to the mixing-chamber so constructed as to prevent all danger of ignition occurring at this point should a light be held adjacent thereto." The invention consists in "novel features of construction and combinations or arrangements of parts" not further described apart from two sheets of elaborately lettered detail drawings.

APPLICATIONS FOR LETTERS PATENT.

4602.—BANCROFT, F. J., and HANSFORD, J. B., "Charging and discharging retorts." March 24.

4674.—FIELD, S. S., and SOUTH METROPOLITAN GAS COMPANY, "Recovery of light naphtha from coal gas." March 25.

4682.—WILTON, G., "Purification of gas." March 25.

4750.—BOUCHARD, A. C. A., "Lighting and extinguishing lamps at predetermined times." March 26.

4753.—TILLEY, F. C., "Vapour burners." March 26.

4770.—RICHMOND GAS STOVE AND METER COMPANY, LTD., and HARTLEY, H., "Gas-fires." March 27.

4801.—CRACKNELL, T., "Mixing gas and air." March 27.

MISCELLANEOUS NEWS.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

The Half-Yearly Meeting.

The Half-Yearly Meeting of the Company was held on Wednesday last, at the offices, D'Olier Street—Mr. JOHN MURPHY (the Chairman) presiding.

The CHAIRMAN, in moving the adoption of the report and statement of accounts (noticed in the "JOURNAL" last week, p. 814), said he trusted he was justified in hoping that the shareholders would consider them of a satisfactory nature, especially when the troubled and serious state of affairs produced by the European War and its far-reaching consequences was taken into consideration, by which the Company, in common with all gas undertakings in the kingdom, had been materially and adversely affected.

WORKS REORGANIZATION.

The works reorganization mentioned at the last half-yearly meeting had been steadily carried out, and, he might fairly claim, in a most successful manner, owing to the efforts of the Engineer, Mr. Newbigging. The new coal-handling plant was practically completed and would soon be put into operation. But for the delay the contractors experienced in getting delivery of the electric cranes and automatic weighing machine, it would now be at work. The laying of a duplicate main to the gasholders, although now completed, was not yet in use, as the season was too far advanced to admit of the connections being made with the holders. The large gasholder in the Barrow Field had been re-painted, under contract, in a most satisfactory manner; and it was intended to paint the holders on the works site and the oil storage tanks during the summer.

STOVE REPAIRING.

A great improvement, tending to considerable economy, had been effected by transferring the stove-repairing shop from Hawkins Street to the works on the Quay. A building there, formerly in use as a coal-store, had been utilized for this purpose. The work of cleaning and repairing the stoves was being performed with greater dispatch at a reduced cost, and the men were working under much healthier conditions. The usual contract for the repair and renewal of the retort-benches had been placed, and the work would be finished in time for next winter. This contract, and that for the coal-handling plant already referred to, were the only contracts in connection with the works to which the Company were committed.

REVENUE ACCOUNT.

Owing to the different form in which the accounts were now submitted, and the consequent alteration in the allocation of various items, it would be very difficult to enter into a comparison between them and those of the corresponding period of 1913. Of course, from now onward this difficulty would disappear; but on this occasion he proposed to deal simply with the past half-year's accounts as they stood. They had been in the shareholders' hands for some little time, and he did not think he need deal with them at very great length. Beginning with the revenue account, the profit, as disclosed, £53,111, was the largest for any half year in the existence of the Company, notwithstanding some circumstances by which the account had been adversely affected. Certain expenditure in connection with fixing cookers, fires, &c., hitherto charged to capital, had now been debited to revenue. Then, again, the reading of the ordinary meters had been very much expedited, affecting the quantity of gas shown as sold by about 15½ millions, and the money receipts by about £2700. In explanation of this, he said that hitherto the reading of meters for what they called the December quarter was not completed until towards the end of January, and, of course, the half year got the benefit of the consumption until such completion. On this occasion the reading was commenced a few days earlier, and completed a week sooner. Again, the reduction in consumption caused by the restrictions consequent upon the earlier closing of licensed premises and the general economy on the part of private consumers had had its effect. Against this decrease they had an increase of about £2600 on prepayment meters. As regarded residuals, there was a substantial improvement in sulphate of ammonia; but coke, owing to the high prices ruling during the strike in 1913, was considerably down. There was also a heavy decrease in tar. The high rates of freight, consequent upon the scarcity of tonnage, practically destroyed the export trade, causing a plethora in the home market and a consequent reduction in value. This affected most of the large gas undertakings in the kingdom very seriously.

REDUCTION IN PRICE.

As to revenue expenditure, there was a total decrease of £24,000; but, as already indicated, owing to the changed method of allocation, comparison of specified items with those of the second half of 1913 would be valueless. During the half year 254 new cookers and 412 new fires and radiators were fixed, and 648 new prepayment installations made. He was glad to say that, though the London Gas Companies and various others had been obliged to advance the price of gas, they (in Dublin) had not found it necessary to do so. They had put into force a reduced scale of charges for gas used for power purposes, and hoped for good results and a development of consumption of this nature.

SPECIAL PURPOSES FUND.

Dealing with the profit and loss account, he said the balance from revenue account (being the net profit for the half year) was, as he had mentioned in the beginning of his remarks, £53,111. From this they had appropriated the sum of £8644 in reduction of the amount standing on capital account for ordinary and prepayment meters, being equal to 10 per cent. per annum, and also the sum of £8120, or 10s. per cent. on the paid-up capital of the Company, to a special purposes fund, which they considered an absolute necessity in view of the possible higher prices of coal and the increasing rates of wages. Moreover, a considerable quantity of disused plant at the old gas-works now being demolished at Mountown (Kingstown) would have to be dealt with. These two sums, together with £9244—interest on debenture stock and temporary loans—deducted from the amount standing to the credit of profit and loss account, there remained a balance of £31,543. Out of this balance the Directors recommended the payment of a dividend at the rate of 2½ per cent. per annum, less income-tax, which would absorb £17,782, and leave £13,762 to be carried to the next account.

SUPERANNUATION.

The only other account he would refer to was No. 7—officers' superannuation fund. Some of the old officers of the Company having retired after many years of service, their pensions become a charge on this fund; but he wished to state that it was the intention of the Directors, as soon as they considered the position of the Company might warrant it, to ask the shareholders to authorize a resumption of contributions to the fund.

NEW SECRETARY AND ACCOUNTANT.

The late Secretary and Manager (Mr. Francis T. Cotton) having resigned, they had been fortunate in securing in his place, as Secretary and Accountant, Mr. Wm. J. Grey, whose appointment, he felt assured, would prove most satisfactory in every way. As the remuneration of the Secretary had to be fixed by the shareholders, a resolution dealing with the matter would be submitted.

ECONOMIES.

When he had the privilege of addressing the last half-yearly meeting, he ventured to say that he saw no reason that, with the improvements that had been, and were then being, carried out, the Company should not rapidly attain a state of prosperity, and he hoped the report and statement of accounts submitted would satisfy them that his anticipations were being realized, and that they had made a good start. They had not yet fully reaped the benefit of various economies which would gradually take effect; but they could not disguise or conceal from themselves the difficulties that in the present state of affairs might arise from day to day. Therefore, any attempt at a forecast as to the immediate future would be futile. In conclusion, he expressed, for himself and his colleagues, appreciation of the very great and unremitting attention of the Engineer, the Secretary, and every member of the staff to the Company's interests.

WAR INFLUENCES.

Mr. W. H. DAVIES, in seconding the motion, said a great difficulty which the Company had experienced since the outbreak of the war was in keeping up ample supplies of stocks, especially of coal. There were two reasons for this—the shortage of output from the collieries from which they got their supplies—the number of colliers who had joined the Colours, and restricted shipping facilities by reason of the Government's commandeering of so many steamers. The question of supplies had caused grave anxiety during the past few months. At times, indeed, the situation was most critical, particularly when hostile submarines made their appearance in the Irish Sea. He spoke in high praise of the efforts of Messrs. Newbigging, Dickens, and Bond during the period of crisis. Mr. Bond, he thought, had done more than anyone else to enable the Company to get the supplies that were essential. But he warned the shareholders that they were not yet out of the wood. The position might become worse as the war proceeded. But it would be a relief to them to know that they stood better in the matter of oil and coal supplies than they did on Dec. 31 last. He added that a tribute should be paid to the captains and crews of the coal boats who had been crossing the Irish Sea in these strange times. Their boats were slow, and they ran more danger than those going faster.

POLICY AND DIVIDEND.

The policy of the Board was to give to the Dublin public a good, uniform quality of gas at the very lowest possible price. They had made a good start in this direction by formulating a graduated scale of prices for consumers using gas for power purposes. Their object in this was to encourage a greater output, which would be naturally beneficial by reducing the price of gas to the consumer and giving a fair return to the shareholders. He understood that some shareholders were disappointed that only 2½ per cent. dividend had been recommended for the half year. Many, it seemed, had expected 5 per cent. He explained, amid laughter, that they had no money, and he urged that the objection of six months ago to the realization of securities still held good. Such a step as that would involve considerable sacrifice; and he was sure they would not like that. It was absolutely necessary to do what they could to conserve their resources and to strengthen their financial condition without increasing the capital, which was already overloaded. They, accordingly, asked the shareholders to be lenient with them, to have patience, accepting the assurance that the Company had now turned the corner and were going full speed ahead to what he hoped would be a career of prosperity.

The motion was adopted, and, on the proposition of the CHAIRMAN, seconded by Mr. BOND, a dividend at the rate mentioned in the report was agreed to.

RE-ELECTION OF DIRECTORS—REMUNERATION OF SECRETARY.

Mr. DICKENS moved, and Mr. BOND seconded, the re-election of Messrs. John Murphy, John E. Fottrell, and John L. Scallan as Directors of the Company. This was agreed to.

The CHAIRMAN moved, and Mr. TRESILIAN seconded, that the remuneration of Mr. W. J. Grey as Secretary and Accountant be fixed at the rate of £750 per annum. This also was agreed to.

Professor PURCELL moved, and Mr. P. BYRNE seconded:

> That Mr. William Cash, Chartered Accountant, of 90, Cannon Street, London, be elected an Auditor of the Company, that the remuneration of the Auditors of the Company for the coming year be at the rate of ten guineas per annum for each Auditor; also that it be an instruction to the Auditors to employ the services of Messrs. Cash, Stone, and Co., Chartered Accountants, of London, to examine and report on the

accounts of the Company for the half years to be ended June 30 and Dec. 31 next, and that the remuneration to be paid Messrs. Cash, Stone, and Co., shall not exceed the sum of £150 per annum, to include all travelling and other expenses incurred by them.

As an amendment, Mr. MICHAEL MURRAY moved, and Mr. JOHN M'BRIDE seconded, that a Dublin firm of chartered accountants be appointed; his contention being that in a case of this kind it was only fair a home firm should have preference.

Mr. BOND said that Messrs. Cash, Stone, and Co., were at the top of the ladder as experts in gas and water auditing across the water, and suggested that hitherto the audit had not been what they would have liked. He thought it was scarcely fair, in the circumstances, for Mr. Murray to propose this amendment. He assured the shareholders that the Board made it a point, when at all possible, to give employment to Ireland—indeed, it was their interest to do so. He appealed to Mr. Murray to withdraw the amendment.

Mr. DICKENS and Mr. FOTTRELL joined in the appeal.

The CHAIRMAN intimated that, if the amendment were pressed, the proxies held by the Directors would be cast against it.

Mr. MURRAY thought he was justified in moving as he had done, but he recognized that the proxies would defeat his amendment, and that, and the appeal made to him, induced him, with Mr. M'Bride's consent, to withdraw.

Professor PURCELL's motion was then put and carried.

This ended the meeting.

BRITISH GASLIGHT COMPANY, LIMITED.

Effects of the War.—The Question of Coal Freights.

The Half-Yearly General Meeting of the Company was held last Wednesday, at the London Offices, No. 11, George Yard, Lombard Street, E.C.—Sir CORBET WOODALL, D.Sc., in the chair.

The SECRETARY (Mr. A. W. Brookes) read the notice convening the meeting, as well as the report of the Directors, the Auditors' report, and (in compliance with the Act of Parliament) the accounts alluding to the Norwich station. The report of the Directors was as follows:

The Directors submit the half-yearly accounts of the Company to Dec. 31 last, as examined and certified by the Auditors, who have also vouched for the correctness of the investments held by the Company. The available profit is £25,912 10s. 7d., after deducting the following sums: Income-tax, £3277 17s. 6d.; Hull debenture interest, £2044 13s. 9d.; Norwich debenture interest, £1717 10s. 9d.; Potteries debenture interest, £636 2s. 5d.; Trowbridge debenture interest, £159 0s. 8d.; and interest on debenture stock, £2181—total, £10,016 5s. 1d.

HULL.—The gas-rental shows a decrease of £1839, as compared with the corresponding period of 1913; the price of gas having been the same—viz., 1s. 10d. per 1000 cubic feet. Coke shows a decrease of £5751; tar and tar distilling, a decrease of £2221; and ammoniacal liquor and sulphate of ammonia, a decrease of £1924. Coals have cost 15s. 5d. per ton, as against 14s. 11d.; and coke has realized 9s. 2d. per ton, as against 12s. 1d. The gas sold shows a decrease of 21,195,987 cubic feet, equal to 2·71 per cent. The quantity supplied in bulk to the Corporation for the supply of the Old Town was 39,031,000 cubic feet, being 4,146,000 cubic feet less than in the same period of 1913. The profit realized is £6046 12s. less than the parliamentary interest. This sum will be taken from the reserve fund, leaving £20,406 0s. 5d. to the credit of that account.

NORWICH.—The gas-rental shows an increase of £389, as compared with that of the corresponding period of 1913; the price of gas having been the same—viz. 2s. 10d. per 1000 cubic feet, with reductions for gas used for manufacturing and other purposes. Coke shows a decrease of £581, and tar, tar distilling, and ammoniacal liquor a decrease of £529. Coals have cost 18s. 11d. per ton, as against 18s. 4d.; and coke has realized 15s. 4d. per ton, against 15s. 8d. The gas sold shows an increase of 3,712,780 cubic feet, equal to 1·41 per cent. The profit realized is £1594 14s. 5d. in excess of the parliamentary interest.

POTTERIES.—The gas-rental shows a decrease of £270, as compared with that of the corresponding period of 1913; the price of gas having been the same—viz., 2s. 6d. per 1000 cubic feet, with a rebate of 3d. per 1000 cubic feet for prompt payment. Special discounts to large consumers and to consumers of gas for power purposes are also allowed. Coke shows a decrease of £1813, tar a decrease of £968, and ammoniacal liquor and sulphate of ammonia of £443. Coals have cost 13s. 3d. per ton, as against 13s. 5d. Coke has realized 9s. 9d. per ton, as against 11s. 9d. The gas sold shows a decrease of 3,815,484 cubic feet, equal to 1·98 per cent. The profit realized is £1678 12s. 4d.; being £5775 15s. 2d. less than the parliamentary interest. The exceptionally small profit is accounted for by a reduced yield from residuals of about £3000, and by an expenditure during the half year of nearly £2000 upon improvements at the Etruria and Brownhills works and at the Company's show-rooms in Hanley and Tunstall.

TROWBRIDGE.—The gas-rental shows an increase of £374, as compared with that of the corresponding period of 1913; the price of gas having been the same—viz., 3s. per 1000 cubic feet, with discounts. Residual products show a decrease of £29. Coals have cost 18s. 2d. per ton, as against 18s. 9d. Coke has realized 12s. 7d. per ton, against 13s. 9d. The gas sold shows an increase of 2,496,248 cubic feet, equal to 6·58 per cent. The profit realized is £55 18s. 5d. less than the parliamentary interest.

HOLYWELL.—The gas-rental shows a net increase of £32; the price of gas having been the same—viz., 4s. 2d. per 1000 cubic feet, with discounts. Residual products show a decrease of £24. The profit realized is £442 1s. 10d.

The available profit added to the previous balance of profit and loss amounts to £100,617 5s. From this sum the Directors recommend a dividend at the rate of 10 per cent. per annum, with a bonus of 2s. 6d. per share, both less income tax. The dividend and bonus will amount to £27,000 6s. 6d., and leave a balance of £73,616 18s. 6d.

DIVIDEND AND PROFITS.

The CHAIRMAN, in moving the adoption of the report and accounts, said the circumstances under which the business of the country was being carried on would have prepared the shareholders for results less favourable than usual; but, with this allowance, he thought that they might be content. For the reasons which he gave when addressing them in September last, the Directors had decided to recommend the payment of a dividend as liberal as prudence would permit. The cost of living had risen; and taxation, high as it was, would probably increase before it diminished. These were conditions under which reserves accumulated in more prosperous times might well be called in aid. As stated in the report, the available profit was £25,912, after withdrawing £6046 from the Hull reserve fund and providing interest for debentures, income-tax, &c. The dividend of 10 per cent., together with a bonus of 2s. 6d. per share, as proposed, would amount to £27,000. The balance of profit and loss would thus be reduced by £1088. He wished to make this statement quite clear. The total distribution proposed would exceed the earnings available, not by £1088 simply, but by this sum *plus* the amount withdrawn from the Hull reserve fund—namely, £6046—together, £7134.

UNAVOIDABLE INCREASE IN THE PRICE OF GAS AT HULL.

He thought it was explained six months ago that all the chief works of the Company had, in comparatively recent years, been to a large extent rebuilt. So far as the works executed were renewals, and not extensions, they were charged against revenue, and the profits of the stations were reduced accordingly. This had been the case especially at Hull; but there, fortunately, the Directors had accumulated a reserve fund of some £50,000. In the course of the past three years, inroads had been made upon this reserve to the extent of nearly £30,000, with the result that it now stood at £20,000. The reconstruction of retort-houses at Hull was not completed; and about £6000 must be provided for this purpose in the next two half years. This they could face without concern, seeing that the reserve fund specially accumulated for the purpose had proved more than sufficient. They had, however, to meet heavily increased charges for coal and oil in the immediate future; and so, to the great regret of the Board, they had had to give notice of an increase in the price of gas, which took effect from the end of the Lady-day quarter. Knowing, as the consumers did, how greatly the cost of materials had advanced, and knowing also how low was the price charged for gas in Hull, they would, he felt sure, regard what had been done as reasonable—indeed, inevitable.

INCREASED AND DECREASED OUTPUTS OF GAS.

At Norwich, the situation was very satisfactory. There had been an increase in the quantity of gas sent out; the price of coal had very slightly exceeded that paid in the corresponding half year; and, greatly to the credit of the Engineer, the sales of coke had been well maintained, and its price had been normal. From the Potteries, there came a somewhat sad report. The output of gas was less by 2 per cent.; and the loss upon the sale of residuals was £3000. Added to this, a sum of about £2000 had been expended in repairing the old works at Tunstall, and in sundry improvements to offices and show-rooms. Gas could not be made so economically at Tunstall as at Etruria; but the security afforded by the plant at Tunstall would enable the Etruria works to be operated much nearer to their full capacity, and correspondingly delay the period when extensions must be made. Trowbridge was one of the towns whose commercial prosperity had been advanced by the war. A large factory there had been fully occupied in the manufacture of khaki.

LOOKING FORWARD—THE FREIGHT QUESTION.

Summarizing the financial result of the half year, the profit earned had been £29,882. Deducting for the debenture interest and income-tax £10,016, there remained £19,866. To this had been added £6046 from the Hull reserve fund, so providing £25,912 for dividend. The Directors recommended a division of 10 per cent., together with a bonus of 2s. 6d. per share, involving a payment of £27,000. The deficiency of £1088 would be taken from the undivided profit, which would then stand at £73,617. Looking forward to the end of the current half year, the dividend was not likely, in his opinion, to be less than that now recommended. Though coal would cost them more and freight would be higher than in the corresponding half year, they would do better with residuals; and some expenses, such as those he had dealt with, would be less. The Company were so far fortunate that only a limited proportion of their coal was carried by sea; the main quantity coming by rail. The Government, who had assumed control of the railways, had not increased the rates of freight. If a similar policy had been pursued with regard to the ships which were in their hands, the community, and to a large extent the poorer members of it, would have been saved a very heavy additional tax—a tax for which, so far as he knew, no justification had been attempted.

WAR ALLOWANCES.

With regard to the war, he had to report that one Director and 179 of the Company's employees had joined His Majesty's Forces. The Directors had granted allowances to dependants of employees; and at the present time these amounted to £1497 per annum. ["Hear, hear."] A bonus of 2s. per week during the continuance of the war had been granted to all workmen and to officials in receipt of small salaries. The cost to the Company of this bonus was at the rate of £5600 per annum.

SALES OF GAS.

Only on very rare occasions—he believed twice—had the Company had to record a decrease in the consumption of gas. For the half year ended in December, the sales had fallen off to the extent of 1·45 per cent. Having regard to the restrictions on public lighting and on shop lighting, and also to the economy which was being exercised generally, it was satisfactory to note that the decrease in business had not been more serious. Trade generally was fairly satisfactory in the areas supplied by the Company; and there was no reason to anticipate any considerable further falling off in the demand for gas. At the Potteries, the public lighting contract had been renewed for fourteen years from Jan. 1 last.

ISSUE OF CAPITAL.

The issue of 2000 shares at the price of £38 per share had been decided upon. The Treasury's approval of the new issue had been applied for; and as soon as this was received, the shareholders would have a letter inviting them to apply for an allotment of the new shares. The Company had an overdraft at the bank of a total amount of £45,000; and a considerable portion of the new issue would, of course, be applied to the repayment of this advance. He feared that his statement had not been a particularly interesting one; but at times like

these one felt that one could hardly speak about the affairs of the Company without venturing upon ground that might be modified in the course of a few weeks or months. He thought, however, that what the Directors had said in their report, and what he had been able to tell them now, fully justified the proposal that he had made as to the dividend and bonus.

Mr. FREDERICK WILKIN formally seconded the motion for the adoption of the report and accounts; and no shareholder having any comments to make, it was put to the meeting, and carried unanimously.

On the proposition of the CHAIRMAN, seconded by Major-General W. T. CORRIE, a dividend was declared at the rate of 10 per cent. per annum, with a bonus of 2s. 6d. per share, both less income-tax.

VOTES OF THANKS.

Mr. HENRY PULLMAN said he felt confident he would be voicing the sentiments of the few shareholders present and the great number absent in rising to place on record their cordial and very hearty thanks to the Chairman and his colleagues for the able way in which they had conducted the business of the Company under the extremely trying circumstances. He could speak with feeling on this subject, because he happened to have devoted many years to the direction of one or two of the Suburban Companies, and he knew, and fully appreciated, the difficulties under which their own Company were working —as no doubt did all the other shareholders. The Chairman had given them a very lucid explanation of the affairs of the Company; and it was gratifying to have so promising an outlook set before them. They had every confidence in the continued able management of the Board, and felt sure it was as pleasing to the Chairman to be able to furnish them with such a satisfactory balance-sheet as it was for them to receive it. He begged to move that the thanks of the meeting be tendered to the Chairman and Directors for their able management of the affairs of the Company.

Mr. B. F. HARRIS seconded the proposition, which was cordially agreed to.

The CHAIRMAN, in acknowledgment, said the Board were very much obliged for the vote. He did not think that he had ever known a time of greater anxiety than the present, with regard to the condition of the affairs of gas undertakings. The extra costs to which the Company were inevitably subjected would reduce the amount of profits available; and the increasing of the cost of gas was so repugnant to most of them that they hesitated greatly about resorting to it But it was unavoidable, though none the less distasteful. It was a time when every officer of the Company, as well as each Director, was put to the utmost strain to try to economize in one direction and another, to compensate for the very heavy losses to which the undertaking was put. At any rate, they all felt that, whatever the strain might be, whatever the loss to which they might be put (because they could not shift the whole of the heavy expenses incurred on to the shoulders of the consumers), they were at one in the resolution that they must face it, and that they would face it, without haggling and without complaint, in order that the work which the country was engaged upon might be carried through in the most efficient manner possible. ["Hear, hear."] Proceeding, the Chairman proposed that the thanks of the shareholders be given to the Secretary and officers of the Company. He remarked that the few words he had already said showed how fully the Board appreciated the fact that, whatever the trials of the time might be, they came chiefly upon the backs—or, at any rate, equally upon the backs—of the officers with those of the Directors. They had had considerable evidence of the success with which the officers were carrying out their duties; and although one shareholder who had written to the Company thought that the Directors had not done all they might do in the way of raising the price of gas, and so filling up the reserve funds and making all things sound and satisfactory from this point of view, the Board felt that they were doing the best they could for the shareholders, while at the same time endeavouring to maintain the stability and the success of the undertaking. In every respect tending this way, the Directors had had the most cordial and zealous co-operation of the officers. With regard to Mr. Brookes, he could not adequately express the extent of the appreciation they felt of the devotion he displayed to his duties. Even when ill, he gave the most unsparing attention to work connected with questions that now arose with reference to the purchase of coal, and matters of this kind. They cordially thanked both him and the officers at the different stations.

Mr. R. S. GARDINER seconded the resolution.

Mr. PULLMAN expressed hearty agreement with the Chairman's remarks. Without the efforts of the officers, he said, the business would not be so successful.

Mr. BROOKES (when the vote had been unanimously passed), on behalf of the officers and several staffs, acknowledged with gratitude the kind expressions of appreciation of their services, and the cordial way in which they had been received by the shareholders.

GASLIGHT AND COKE COMPANY'S EMPLOYEES.

A Bonus Misstatement.

In "The Times" last Wednesday, it was stated that: "The demand of the gas workers employed by the Gas Light and Coke Company for a permanent increase of 6s. a week for all classes has not been granted. Instead, the Company has offered the men an additional war bonus of 2s. 6d. per week, which would make the total bonus 5s. a week. The men have rejected this offer, and further negotiations are being conducted by the officials of the Gas Workers' Union. Several thousand men are affected."

On seeing this, Mr. D. Milne Watson (the General Manager of the Company) promptly addressed to the Editor of "The Times" the following letter: "Regarding the paragraph which appears in your issue of to-day, as to the relations of the Gas Light and Coke Company with its employees, I beg to inform you that the statements, generally, contained therein are without foundation. Some time since the Company gave, without solicitation, a war bonus of 2s. 6d. per week, and beyond that no offer of any additional bonus has been made to the employees, and therefore cannot have been rejected by them. I am glad to say that the relations between the Company and its employees are entirely satisfactory."

CHEADLE GAS ORDER.

Proceedings before the Board of Trade.

The objections of the Cheadle Parish Council to the Provisional Order promoted by the Cheadle (Staffs.) Gas Company were heard at the Board of Trade offices in London last Wednesday by Mr. BOOTH. The Order constitutes the Cheadle Gas Company—who have been in existence for seventy years—a statutory undertaking, and authorizes the creation of £4000 of additional capital, with one-third borrowing powers.

The promoters were represented by Mr. JOHN PROFFITT (Messrs. Batten, Proffitt, and Scott), Parliamentary Agent, Mr. BLAGG (the Company's Solicitor), and Mr. FRENCH, the Engineer; while the Cheadle Parish Council were represented by Mr. PEARCE (M.P. for the Leek Division) and Mr. T. B. CULL.

Mr. PROFFITT said that the road authorities concerned had given their consent to the Order; but the Parish Council had withheld theirs although there was no objection in principle. The first point raised was a purchase clause. Apparently the Parish Council wished to have a compulsory purchase clause, to be put into force whenever they thought fit. If it were worded that the Council must come next session with a Bill, there might be something to be said for the proposal; but to give a clause such as was suggested would absolutely prevent the raising of the capital. The maximum price of 5s. was objected to. But all the maxima in the surrounding districts were in the region of 5s.; and as the present selling price was 4s., he submitted the figure was a reasonable one. The question of the charge for public lighting was raised, as also was a suggested depreciation in the value of property close to the proposed extension of the gas-works. He could only say that the existing works were equally near, and he failed to see why there should be any effect from the extension.

Mr. PEARCE, M.P. (a member of the Local Legislation Committee of the House of Commons), said he had been asked to give what assistance he could to the Parish Council in order to prevent expense. He submitted that the existence of a purchase clause would assist, rather than otherwise, the raising of the Company's capital.

Mr. BOOTH said a clause authorizing purchase by agreement would not carry the Council very far; and if provision was made for arbitration, no lead could be given to the arbitrator, and the Council might be badly hit.

Mr. PEARCE agreed it would be difficult at present to fix a basis for the arbitration.

Mr. PROFFITT offered to give a clause authorizing purchase by agreement. This would enable him to sell his powers as well as his works, which at present he could not do.

Mr. BOOTH contended this would not give the Council powers to buy, and they would have to come to Parliament for them.

Mr. PEARCE thought a clause as suggested by Mr. Proffitt was as far as he could expect to go now.

A clause to the effect that in the event of the Local Authority at any time being authorized to purchase the undertaking, then the Company might sell by agreement is, therefore, to be inserted.

Mr. BOOTH dealing with the maximum price, first pointed out that some protection was given to the Council by clause 23, which authorized the Board of Trade, after three years, to substitute the sliding-scale for the maximum price. Bearing on this also was the question of capital. Rather than, in the present uncertain circumstances, impose too low a maximum price, he would prefer that the £4000 additional capital be reduced to £3000. Then the Company would have to come to Parliament a little sooner for new capital powers, and the Council could raise the matter of price and purchase.

Mr. PROFFITT said the reason for the £4000 was the large expenditure contemplated on gas cookers and prepayment meters. He was willing, however, to adopt Mr. Booth's suggestion to reduce the new capital by £1000 and retain the 5s. maximum.

Mr. PEARCE next asked for a calorific value test instead of an illuminating power test.

Mr. PROFFITT said the Company were indifferent. There were a large number of flat-flame burners still in use in Cheadle; but it was hoped they would change over to incandescent mantles.

It was decided to have a calorific test clause.

With regard to public lighting, it was agreed, after some discussion, to charge the Council 20 per cent. less than the maximum charge for private lighting.

There was a short discussion as to depreciation of property adjoining the gas-works; but it was agreed to leave any reference to this out of the Order, and arrange the matter privately.

The Treasury capital restrictions clause is to be inserted in the Order, which will be unopposed in its further stages.

WELLINGTON (N.Z.) GAS COMPANY, LIMITED.

The report adopted at the 45th Annual Meeting of the Company (for the twelve months ended Dec. 31) stated that the second unit of vertical retorts at Miramar was completed before the end of the year, and that the manufacture of gas at the city works (commenced in April, 1871), had been finally stopped and the works closed-down. During the year, part of the city works was dismantled; and the Directors had written the sum of £10,000 off the item of "Immovable property," shown on the balance-sheet; and made a corresponding

reduction in the item "Works extension reserve," which was provided for this purpose in past years. The Directors were pleased to be able to report that, notwithstanding the disturbance caused by the waterside workers' strike of 1913, and the present war, there had been a substantial growth in the sales of gas, amounting to 11½ per cent. The sum of £3000, which was set aside in 1913 to meet the additional cost of coal arising out of the strike, had been applied to this purpose. The dividend recommended made a total of 10 per cent. for the year on the ordinary shares. After meeting all charges, the amount carried forward would be £22,097.

The Chairman (Mr. D. J. Nathan) explained that the practical output of the two units of vertical retorts would be 2 million cubic feet per day, while the maximum daily demand last year was 1½ million feet. Thus if the increase in the use of gas continued at anything approaching the present rate, it would not be many years before the Company would have to erect further instalments of carbonizing plant, in which case additional capital might be needed. When the city works had been removed and the surplus land either sold or arrangements made for sale, the Directors thought that the time would be opportune for the share capital to be recast by the issue of £1 shares in place of £10 shares. They were also of opinion that when a change was made in the denomination of the shares, it would be wise to follow the British precedent and give an opportunity to consumers to become shareholders in any future issue. The encouragement given to the employees to become shareholders in the Company had been most beneficial in its effects; and the Board were of opinion that in any scheme of reconstruction it might be wise to further give all employees opportunities to be financially interested in the Company, by one of the methods that had been so successful in British gas companies. In consequence of the war, the Board made a special donation on behalf of the Company of £250 to the Wellington Mayor's Patriotic Fund and of £50 to the Poor of Belgium, Great Britain, and Ireland Relief Fund. The Directors also arranged to give half-pay to all employees accepted for military service during the war, and agreed to re-instate in his former position any man returning at the end of the war in a fit condition for his duties, or to find some other employment of a suitable character for him. At first the Board limited the period of half-pay to six months; but they recently determined, at any rate for the present, to continue the payment of half-wages. The Directors were much pleased to report that they had been able to make fresh arrangements with Mr. William Ferguson to retain his position as Managing-Director, upon amended conditions, under which he would give a general supervision to the affairs of the Company, without devoting as much time to the work as under the previous arrangement, which had been in force for more than six years.

THE PRICE OF GAS AT MANCHESTER.

Finance Committee's Report.

Reference was made in the last number of the "JOURNAL" [p. 826] to the probability of an early increase in the price of gas to Manchester consumers, consequent (1) on the increased charges for coal, (2) the decreased yield for residuals, (3) the increased price of stores and materials generally, and (4) the lessened consumption in street and shop lighting (to say nothing of private lighting in the suburbs), caused by observance of the Defence of the Realm Act. There also remains to take into consideration the proposal to grant war bonuses of 2s. per week to those employees of the department earning 30s. per week or less, as well as the fact that war allowances on a generous scale (similar to other Corporation departments) have been, and are still being, made to the dependants of employees who joined the Colours. On the top of all these charges, the department is also expected to keep up its annual contribution of £50,000 in relief of the city rates.

While no definite statement was available from the chief officials of the Gas Department as to the amount of the proposed increase, the Finance Committee issued at the week-end a statement showing that if gas prices were temporarily advanced by 6d. per 1000 cubic feet, the additional income to the department from the 187,870 consumers would be £144,000 for the twelve months ending March, 1916. The new scale of charges per 1000 cubic feet of gas consumed per quarter would then be:

Ordinary Consumers.

	Within the City. s. d.		Without the City. s. d.
Under 250,000 cubic feet	2 8	..	2 11
250,000 and under 1,000,000 . . .	2 7	..	2 10
1,000,000 ,, 2,000,000 . . .	2 6	..	2 9
2,000,000 ,, 3,000,000 . . .	2 5	..	2 8
3,000,000 ,, 4,000,000 . . .	2 4	..	2 7
4,000,000 ,, 5,000,000 . . .	2 3	..	2 6
5,000,000 and upwards	2 2	..	2 5

Gas-Engines.

Under 1,000,000 cubic feet	2 3	..	2 6
1,000,000 and under 2,000,000 . . .	2 2	..	2 5
2,000,000 and upwards	2 1	..	2 4

Automatic Consumers.

30 cubic feet for 1d. if resident within the city, and 28 if resident outside.

Public Street Lamps.

2s. per 1000 cubic feet in the city, and 2s. 6d. outside.

The usual discount of 2d. per 1000 cubic feet will be allowed from the revised scale of charges.

"The Finance Committee desire to point out," says the report, "that the estimates for 1915-16 showed that the year's income would not be sufficient to meet the year's expenditure by £50,444, of which £23,801 was to be made good from the reserve fund, and £26,639 carried forward. Owing to the war, the Gas Department has suffered considerably; and therefore the Finance Committee agree with the proposal to increase the price of gas by 6d."

The proposals of the Gas Department will come before the City Council at their monthly meeting to-morrow (Wednesday).

BIRKENHEAD STRIKE ENDED.

Arbitration Agreed to.

A Special Meeting of the Birkenhead Town Council was held last Tuesday, for the purpose of discussing the strike at the gas-works. The MAYOR (Alderman A. H. Arkle) presided. It will be recalled that the men, to the number of 150, came out on strike on March 11, because they were dissatisfied with the temporary war bonus of 2s. per week, and refused to return unless their demand for an increase in wages, varying from 4s. to 5s. a week, was immediately granted.

The TOWN CLERK (Mr. James Fearnley) said he had received a letter from Sir George R. Askwith, in which the writer stated that he was informed that the men's claim was a pre-war one, delayed by long negotiations, and that it was not considered to be adequately met by a grant of 2s. per week agreed upon by the Council to certain of the employees. He had ascertained that the men would be willing to resume work at once if the Corporation agree to the matter being referred to arbitration. A letter was also received from Mr. Fleming Eccles (the Organizing Secretary of the men's Union), in which he offered, as it was stated that military work was being interfered with by the strike, to arrange for a resumption of duties if the merits of their claim could be dealt with at once by an impartial arbitrator. In this connection, they were willing to accept Mr. G. J. Carter (Messrs. Cammell, Laird, and Co.) as arbitrator, or they would agree to the case being submitted to a court of arbitration upon which labour was represented equally with the employers. The offer was made to avoid any further inconvenience to the ratepayers, and so that the manufacture of munitions of war might be hastened.

Mr. DODDS, on ascertaining that the men were willing to return to work forthwith if the matter was referred to arbitration, suggested that the proposal contained in Sir George Askwith's letter should be carried into effect. He moved that the dispute be referred to Mr. Carter for arbitration.

In the course of some discussion, divergent views were expressed; but eventually the resolution was carried unanimously.

Alderman J. H. M'GAUL (the Chairman of the Gas Committee) said the claim was not a pre-war one. The first intimation they received was some time in December. On July 14, the Engineer (Mr. T. O. Paterson) received a letter from six retort men, in which they asked that an application from them for an increase of wages should be considered; but their formal demand was not received until some time in December or the latter end of November. In view, however, of the strong feeling in the Council, he could have no objection to arbitration. It was utterly impossible for the men to be taken back that day. There was a number of men in the yard who could not be sent away at a moment's notice. This was a strong point, and the rock on which, he was afraid, they would split. The men would be taken back as and when required. They did not want a strike. It was brought about by the impetuosity of a few fiery spirits as found on every works.

The MAYOR asked Alderman M'Gaul to arrange with the Engineer to take back as many men as possible that day, and to refer the question of the reinstatement of the remainder to the Arbitrator.

Mr. Carter has now delivered his award, which gives all-round increases to the employees, varying from 2s. to 3s. 3d. per week for a six days' week. The following are the increases: Vertical retort men —*i.e.*, top men, firemen, and bottom men—hand stokers, firemen, boilermen, and water-gas makers, increased from 5s. 4d. to 5s. 9d. per shift. Assistant boilermen, assistant water-gas men, coal-wheelers, and coke wheelers, increased from 4s. 6d. to 4s. 10d. per shift. Yardmen and night yardmen, increased from 26s. to 29s. 3d. per week.

In his conclusions, Mr. Carter says: "The above increased rates are all to be based on a 54-hour week, and are to be considered as an increase of wages—*i.e.*, if any men have been receiving a war bonus, this increase of wages will supersede the same, and the war bonus will consequently cease as such. All overtime to be paid for at the existing rate. All Sunday labour to be paid for at time-and-a-half; but in the case of night yardmen this time-and-a-half is to be paid for Sunday night only. It is very desirable that all men required should be reinstated in the positions held by them prior to the stoppage of work as quickly as possible. Regarding the men, of course, it is understood that the number employed always varies with the season of the year; and for this reason some who were working before the stoppage cannot now be employed. Time lost due to the cessation of work over the dispute that has taken place is not to be considered a breakage of service in the case of men returning to the Committee's employment under this award."

COVENTRY AND THE PRICE OF GAS.

The increased working costs for the ensuing year have led to the decision to raise the price of gas in Coventry. At the last meeting of the City Council, the Gas Committee reported that the Engineer and Manager (Mr. Fletcher W. Stevenson) had submitted the following estimate of extra costs: Due to increase in the price of coal, £14,500; increase of wages, £2000—total, £16,500. The Committee recommended that, in order to meet these additions, the price of gas be increased 4d. per 1000 cubic feet throughout the scale, such increase to take effect from the next reading of the meters.

Mr. QUINNEY (the Chairman of the Gas Committee), in moving the adoption of the above recommendation, pointed out that the extra working costs were estimated really to amount to £17,600. This was undoubtedly a very large figure; but they had to remember that the Gas Department carbonized something like 95,000 tons of coal during the year, and the average rise in the price of coal had been 5s. per ton. It was calculated that in the coming year they would carbonize about 88,000 tons. If they worked this out at 5s. per ton, they would see that it came to £22,000. Fortunately, they had not to deal only with these figures, or the situation would be very much worse. They had

a large amount of coal to come in during the year at the old contract price; and because of this the estimated deficiency would be reduced to something like £14,500. They had also to pay about £2000 extra in wages; and with an estimated loss of £1000 on the sale of tar, they had a total of £17,500. In order to meet this, the Committee found it was absolutely necessary to increase the price of gas to the extent of 4d. per 1000 cubic feet. The proposal, he maintained, was absolutely reasonable and justifiable; and the conditions that had arisen were quite unavoidable.

Mr. KENDRICK seconded the adoption of the Committee's recommendation, pointing out that if the extra charge was not met in the way proposed it must fall on the rates.

Mr. FRED LEE opposed the recommendation. He said that, as Chairman of the Electric Light Committee, he wondered whether they were going to be placed in the same position. They were undoubtedly all faced with the same difficult problem—the increased price of coal; but after looking carefully into the figures, he had every confidence that his Committee would have no such recommendation to bring before the Council. At this time everyone had to be careful as to what he did with regard to increasing the price of commodities. If the proposed increased charge were adopted, it would fall heavily upon the prepayment consumers, who provided a very considerable part of the revenue of the Gas Department. Dwellings supplied practically 60 per cent. of the revenue, leaving 40 per cent. derived from the sale of gas for manufacturing purposes. The price should not be increased more than was absolutely necessary, owing to the working class using such a large proportion of the gas—their contribution being equal to 43 per cent. of the whole. Last year the profit from the gas undertaking amounted to £12,638; and of this sum £5000 was voted towards the relief of the rates—£7000 being allocated towards meeting the loss of capital consequent upon the abandonment of plant at the old works in Gas Street. He thought that an increase of 2d. per 1000 cubic feet would have been sufficient, and moved that the recommendation of the Committee be referred back.

Mr. WYLES seconded the amendment, as he maintained that there was no reason why they should go in for making a huge profit.

Alderman BATCHELOR (a former Chairman of the Gas Committee) agreed, after what had been stated, that 2d. would be enough to put on.

Mr. QUINNEY, replying upon the discussion, said that if the Council adopted the idea of only charging 2d. per 1000 cubic feet extra, it was certain that before very long the Committee would have to come before them again, and ask them to sanction a further advance of 2d. The Committee had studied the small consumer, as evidenced by the fact that last year a reduction of 2d. per 1000 cubic feet was made to the prepayment meter users. He did not want the Council to think that they were going to get £12,000 profits from the gas undertaking again this year, because they would not do so.

It was eventually agreed to alter the amendment so as to allow of an increase of 2d. per 1000 cubic feet; and in this form it was agreed to.

WEST BROMWICH AND RATE AID.

At the last Meeting of the West Bromwich Town Council the question of the trading undertakings making grants to the rates was discussed, when the estimates for the year were considered. The Finance Committee recommended an increased general district rate of 2d. in the pound.

Mr. W. LAWLEY raised the question as to whether at this time the gas and electricity undertakings ought not to come forward and give them financial assistance, to help to keep down the rates. He reminded the Council that years ago the gas undertaking had contributed very handsome sums; and he failed to see why this policy should not be continued by both concerns. In making grants from the gas undertaking to relieve the rates, West Bromwich would only be following the example of other prominent towns. There might be arguments used against handing over the profits, on the ground that the consumers ought to have the benefit; but he urged that the consumers at West Bromwich did not obtain any benefit whatever, for gas and electricity were not sold cheaper than in other towns. Therefore if other authorities could make profits and hand over money towards the relief of the rates, they must be smarter than West Bromwich. He was a member of the Gas Committee; and he believed they would have a fairly good year. It was his impression that the Borough Treasurer was opposed to making grants out of the profits of the trading concerns; and he approved of appropriating the profits for building-up the financial resources of the undertakings and making them more sound. Ten years ago they had a floating debt of over £20,000 on the suspense account of the gas-works; but every penny of this had now been paid off.

Mr. J. BROCKHOUSE (the Chairman of the Gas Committee) said he was surprised at the remarks of Mr. Lawley, who knew all about the gas undertaking. He should hold up both hands, under the present conditions, and knowing what he did of the finances of the Gas Committee, against any sum whatever being given out of the profits in relief of the rates. He had known the time when the gas undertaking gave sums of £3000 and £2000 to the rates; but it was a great mistake, and the concern was to-day suffering from it. By selling gas at the lowest possible rate they were doing good service to the town; and in this respect West Bromwich compared well with places of a similar size. Things were very different now from what they were ten or fifteen years ago.

Alderman J. LAWLEY said they were able to get their coal and labour as cheaply as other places; and if those other places could give some financial help to the rates, he wanted to know why West Bromwich could not do the same. The ratepayers found the capital to work the concerns, and in return they ought to have some relief.

Mr. J. A. KENRICK said if any member of the Council would look at the balance-sheets of the gas and electricity undertakings for the past few years, he would see plainly the reason why it was not thought advisable to hand any money over. If they did relieve the rates from the profits of the gas undertaking, they would cripple it—especially in view of the tremendous expense that had been incurred in the introduction of the new system of retorts.

Mr. A. VAUGHAN said he had given considerable attention to the gas accounts. For years past grants had been made for the relief of the rates; but it was clear to his mind that it would be unwise for some time to come to take money from the concern. The Gas Committee were, however, making a slight contribution, in that public lighting was supplied at a loss.

Ultimately, the suggestion that the trading departments should assist the rates was rejected, and the increased rate of 2d. in the pound was adopted.

GAS AND THE RATES AT HALIFAX.

The estimates for next year's rates were considered at a meeting of the Halifax Town Council last Friday week, which was presided over by the MAYOR (Alderman W. H. Ingham). They provided for a rate of 9s. in the pound, in place of 8s. 10d., on the top of an increase of 2d. in the poor rate.

Alderman F. WHITLEY THOMSON (the Chairman of the Finance Committee) said they were passing through a most terrible crisis. The war, of course, caused great expenditure. It had resulted in all corporations having a very much increased "outgo," and unfortunately no increased income. There were two ways to meet larger expenditure—one to try to cut down expenses, and the other to strive for a greater income. On the Finance Committee they were endeavouring to do both. Not long ago, large capital sums were asked for by the Gas and other Committees. Representation being made, however, to them, they at once decided to postpone capital expenditure amounting to over £50,000. This was before the Government sent out the circular calling on municipalities to curtail, and in many cases to altogether abandon, capital expenditure. The Council would be surprised to learn what the war was costing the Corporation. Included in the various estimates there was a sum of £12,825 for making up the difference between the wages earned and the pay and allowances which were granted by the Government to those of their municipal employees who had voluntarily given their services for the Army and Navy. Of this amount, £4212 was for the eight months which were passed, and the balance of £8613 was estimated for the next year. Both sums had to be reckoned in estimating the financial proposals for 1915-16. In addition, the Watch Committee and the Water Committee had spent £2350 for guarding the reservoirs, railway stations, and bridges, &c. One effect of the war had been the increased price of money, though it was rising before the war broke out. This, again, had hit the Corporation. Interest and sinking fund, which were included in the estimates, had increased by no less a sum than £5900. Then wages were over £4000 up, without taking into account any special war bonus. Income-tax had doubled, and was costing them £4000 a year more. The increase in the price of coal for the gas and electricity works amounted to no less than £11,500. Altogether, he had had to include in his estimates an additional sum of £43,668; and all this had to be met out of the current year's rate. Turning to the estimates, the rate for 1914-15 was estimated to produce £195,744; and they really had received this sum. There was a re-assessment, however, of the gas-works, bringing down the amount; and this meant a loss in rates from the gas-works of £5944. The real amount they received was thus £190,150. This year the amount they required to be raised from the rates was £199,434, or an increase of £3680, which was equivalent to a rate of 2d. in the pound. The Markets Committee were giving an increase of £550 profits, making their contribution £1000. The reduced sums handed over by the Tramways, Gas, and Electricity Departments, amounting to £6150, were due to the fact that they had been permitted to pay their large expenditure on military allowances out of the 1½ per cent. on their capital which they had hitherto been required to contribute to the rates. The gas-works had increased their sales by about 2 per cent.; but gas and coal had gone up enormously, and the price of residuals had gone down, with the result that the gas-works showed at present a heavy loss. There was only one thing to do, therefore, and that was to increase the price of gas. A considerable advance would be necessary to make both ends meet. It was suggested that there should be a war bonus of 2s. per head per week allowed to all men earning less than 30s. or 35s. per week, whichever might be adopted. He moved the approval of the estimates.

Alderman SPENCER said the thing that puzzled him was the Gas Committee. It was a great mistake to pledge profits in advance. The gas profits had been taken before they were actually made; and the result now was that they were obliged to put up the price of gas to give about £9000 to the relief of rates. This was not a fair incidence of taxation. Some consumers used gas largely for business purposes; and he did not see why they should have to bear the fixed charge of 1½ per cent. on the capital, in order to relieve other ratepayers. It seemed to him that the price of gas would have to go up 6d. per 1000 cubic feet, or something near it; and this was a very serious thing. Admitted that the price of coal was increasing, a great deal of the responsibility had to be put on the Gas Committee themselves for the ridiculous cut-throat prices they created some time back. They had spent a good deal of money on high-pressure mains; and the policy, which was a bad one, ought not to be continued. They had entered into an agreement with the Hipperholme Council, involving a large capital outlay; and the Hipperholme ratepayers, so far as the Bailiffe Bridge portion was concerned, would get gas cheaper than Halifax. This was the first time in his knowledge that the Gas Department had had to show a heavy deficiency, and the price had to be raised to assist the rates. It was not sound finance, and was good neither for the rates nor the Gas Department. As to the advance of 2d. in the rates, it was a modest increase, in the circumstances, and was largely due to allowances to soldiers' dependants.

Mr. OLDFIELD mentioned that some years ago the Council extracted from the gas-works nearly £20,000 in one year. The Committee were in an unfortunate position at the present moment; and if the

Council relieved them of the 1½ per cent. for one year, they could manage by only increasing the gas 2d. per 1000 cubic feet. If, however, they could not have some relief, they would probably have to raise the price 6d. As to high-pressure mains, they had made a profit of £346; and the expense of laying the mains to Lightcliffe was to increase the service in the district. They hoped to make it a good thing in the future.

Mr. WADDINGTON contended that gas and electricity ought to be under the control of one Committee; so that there could be more uniformity in regard to charges. The Gas Committee, however, had not got into their present position by cut-throat prices, because high-pressure lighting had paid for itself ever since it was introduced. They were in the dilemma owing to the unfortunate expenditure some years back, when the gas-works were made considerably bigger and grander than was needed at the time. If the Committee were relieved of the charge of 1½ per cent. on the capital expenditure, they would be able to reduce the price of gas 3d. per 1000 cubic feet.

Mr. H. CLAY contended that none of the revenue earning Committees could begin talking about profit until they had paid to the Council the 1½ per cent. claimed as insurance. The ratepayers of the town, acting through the Council, were responsible for these undertakings; and it was only reasonable that they should pay back to the ratepayers a percentage for the risks they took. The position of the Gas Committee was somewhat unfortunate. They were faced with the increased price of coal and a decrease in the price of residuals. Though gas was a monopoly, the charge would not be unreasonable if the price was raised; but the policy of the Council with regard to the relation between gas, electricity, and water charges was wrong. It was not fair that they should charge consumers more for either electricity or gas in order to make good the deficiency on water.

Mr. M. CROSSLEY explained that the Water Committee, unlike the electricity or gas-works, were governed in their prices by Act of Parliament. He agreed that the charges were very low; but to get an Act to increase them would be a costly matter. If they were paying more in the rates ratepayers were getting water at a cheap price; and they could not have it both ways. The time would come when the water-works would make a profit towards the relief of the rates.

After some further discussion, the estimates were approved.

On Wednesday evening, a Special Meeting of the Gas Committee was held to consider the question of advancing the price of gas, in consequence of the increased price of coal and reduced receipts from residuals; the latter being brought about by the closing of the German market. After a protracted discussion, the Committee decided to advance the price 6d. per 1000 cubic feet. The Council will, at their May meeting, be asked to sanction this, as from July 1.

Should the new scale be sanctioned, the charges in the borough for lighting, cooking, &c., will be: Under 220,000 cubic feet per quarter, 2s. 7d. per 1000 cubic feet; 220,000 feet and under 450,000 feet, 2s. 6d.; 450,000 feet and upwards, 2s. 5d. For gas-engines, the revision will make the charges: Under 220,000 cubic feet per quarter, 2s. 4d.; 220,000 feet and under 450,000 feet, 2s. 3d.; 450,000 feet and upwards, 2s. 2d.; exceeding 6,000,000 feet per annum, 1s. 10d. The charges for heating purposes will be increased as in the case of those for lighting. In the outside districts, basing the revision on a scale agreed to some time back, but not yet operative, the altered charges for lighting purposes will be: Under 220,000 cubic feet per quarter, 3s. 0½d.; 220,000 feet and under 450,000 feet, 2s. 11½d.; 450,000 feet and upwards, 2s. 10½d.

It is calculated that the recommended advances will raise for the gas undertaking about £17,000 per annum from ordinary gas users, and £2400 from consumers for power and heating.

INCREASED CHARGES FOR ELECTRICITY.

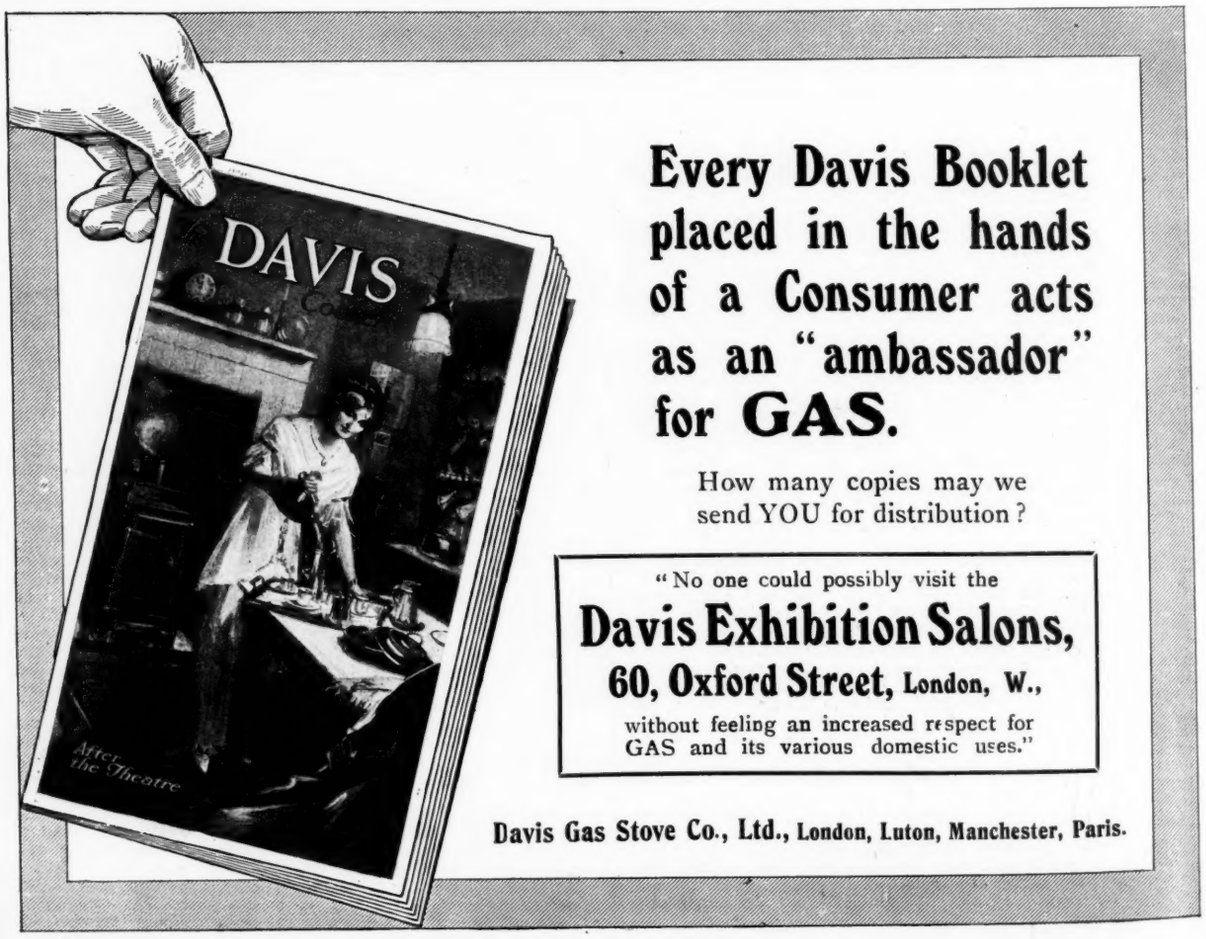
Sliding-Scale Gas Supply and Maximum Price Electricity Supply.

At last Tuesday's Meeting of the London County Council, Mr. W. C. JOHNSON asked the Chairman of the Special Committee on London Electricity Supply if he had seen, and his Committee would consider, a question which had been raised in the Press as to "whether the electric lighting companies were entitled to burden their consumers with increased charges in order to maintain dividends?" He also desired to know what compensation the electricity companies offered in return for the monopoly they enjoyed, and whether such a privilege did not place on them an obligation to the public which ought to be defined and made compulsory—as, for instance, the sliding-scale of the gas companies, whereby an increase of price to the public involved a decrease of dividends to the shareholders.

Mr. G. H. HUME (the Chairman of the Committee) replied that electricity in London was supplied by the companies under Provisional Orders. These Orders provided that the charge should not exceed the specified maximum price, which, although in one case 10d. and another case 5d., was, generally speaking, 8d. per unit. The prices which were being charged were below the maximum, and permitted of a considerable percentage increase before the maximum was reached. In Orders granted since 1889, it was provided that the Council, the local authority, the undertakers, or any number of consumers (not less than twenty) might apply to the Board of Trade within five years of the Order, or the last revision of same, for an alteration in the prices or methods of charge. The companies were apparently acting within their legal rights.

Mr. JOHNSON asked whether the "antiquated regulations" quoted by Mr. Hume were sufficient protection to the public, or whether some drastic treatment was not required.

Mr. HUME replied that the Special Committee had tried to deal with the whole question in a comprehensive way; but their electricity scheme had failed. The Committee would, however, consider this particular question from a practical point of view.



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SUGGESTED WAR BONUS AT MANCHESTER.

As stated in the last two numbers of the "JOURNAL" [pp 759, 817], various departments of the Manchester Corporation have had under consideration during the past few weeks the question of paying a war bonus to their employees.

The Gas Committee considered the feasibility of paying 2s. per week extra to 1560 employees receiving less than 40s. per week. The Water Committee, however, did not go so far as this, and recommended that 2s. bonus be granted to those of their employees who received 30s. a week or less. On the other hand, the Finance Committee gave a strong lead to other departments by deciding that no bonus should be granted to employees in their own department; the result being that the City Council decided that the whole question should be reconsidered by a Special Sub-Committee of the Finance Committee, who have now recommended that a bonus of 2s. per week should only be added to incomes of 30s. per week or less. The Finance Committee, at their last meeting, formally approved the recommendation of the Special Sub-Committee, so that the proposal now goes forward to the Council.

DUBLIN ELECTRICITY UNDERTAKING.

In a report just issued by the Dublin City Treasurer and City Accountant in regard to the working of the Corporation electrical undertaking for the seven years ended in March, 1914, the capital borrowed is stated as being £790,717; repayments, £197,873; and indebtedness, £592,844. It is mentioned that there were deficits in 1907-8 of £4653, in 1908-9 of £6848, and in 1909-10 of £4769; while surpluses are recorded decreasing from £11,670 in 1911-12 to £4917. The consumers numbered 1687 in 1909, and 6372 in 1914. The income from private consumers rose from £35,996 to £83,916; showing a total of £395,754, exclusive of charges to Corporation departments. The levy on rates since 1891 was £52,174, and the transfer in aid of rates amounted to £5500; making the net rates levy £46,674.

The officials indicated state that there was an increase in current sold in six years of 160 per cent.; while for power the increase in five years was 400 per cent. The reduced surplus for 1913-14 (total £4917) is taken as a justification of the retention of a 10 per cent. increase in price. It is not considered that the falling off is likely to be converted into a deficit. Reasons for the decline are given: Reduced average price per unit owing to the great increase in consumption power and heating, increased cost of production, heavy capital expenditure, and raised rates of interest, with curtailed repayment periods. It is agreed that there is no reason to object to the modification of the Supply Committee's proposal for a reduction of an originally proposed increased charge from 1d. to ½d. to half these amounts for lighting and power, respectively, up to the end of June next, with such modifications after that date as may be found necessary.

At a meeting of the Corporation, Alderman Kelly remarked that "no business man would be satisfied with knowing how his accounts stood twelve months ago." It is understood the whole question of the electrical undertaking will be dealt with at a special meeting.

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

At the meeting of the Edinburgh and Leith Gas Commissioners on Monday, reference was made in the minutes of the Works Committee to a war bonus to certain employees. In a letter sent by the Secretary of the National Union of Corporation Workers applying for an increase of wages to employees at the Granton works and the distribution departments, it was stated that, owing to the increased cost of commodities, the men felt that their present wages were by no means adequate to cope with the necessaries required. The writer pointed out that at the present time there is a general increase of wages all over the country. The application had been investigated by the Consulting Engineer to the Commissioners (Mr. W. R. Herring, M.Inst.C.E.) and by their Engineer and Manager (Mr. Alexander Masterton), who presented a report, in which they suggested the granting of an allowance in the shape of a war bonus—2s. 6d. a week to the workmen earning from 20s. to 30s. a week, and 2s. a week to those earning from 30s. to 40s. a week. After consideration of the report, the Committee recommended the Commissioners to grant the bonus, and to continue it till the expiration of one month from the declaration of peace, and not to calculate it as wages in respect of superannuation fund contributions by employers or employees. The recommendation was unanimously approved of. The additional outlay incurred amounts to £61 11s. 6d. per week, or £3201 18s. per annum. Mr. Lindsay, the Convener of the Committee, explained that the bonus would be paid in respect of employees at the front who had dependants.

Reference was made in last week's "Notes" to the arbitration which will shortly take place to determine the price to be paid by the Kinross Town Council for the undertaking of the Gas Company. It has since transpired that Mr. H. P. Macmillan, K.C., who was Junior Counsel in the Kirkcaldy gas arbitration, has charge of the case for the Company; his junior being Mr. J. B. Paton, advocate, who was in the Bridge of Allan gas arbitration. Mr. Henry O'Connor is the principal witness for the Company, for whom also Mr. E. Herbert Stevenson is to give evidence; while Mr. Arthur Valon is the expert witness for the Town Council.

At a meeting of the Cleaning and Lighting Committee of the Edinburgh Town Council on Monday, it was reported that the Gas Commissioners had fixed the price of gas for public lighting this year at

Main Matters.

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2s. 5d. per 1000 cubic feet for incandescent lighting, against 2s. 3d. last year, and at 2s. 9d. for flat-flame lighting, compared with 2s. 7d.

For some years the consumption of gas in Cupar has been rapidly increasing; and in the past winter the strain on the works must have been enormous, owing to the presence of the military in the town. The existing carbonizing plant is to a large extent worn out, and the Directors of the Gas Company have had under consideration the question of erecting new retorts, and verticals were suggested. A deputation recently visited the Helensburgh Gas-Works, and the results obtained there having impressed them favourably, the Directors have decided to erect vertical retorts in place of the existing horizontal ones, at an estimated cost of £6000.

Lighting of Enniscorthy.—In the course of a Local Government Board inquiry into an application by the Enniscorthy Urban District Council for a Provisional Order to carry out an electric lighting scheme, it was stated that the principal reason why the Council had promoted the scheme was that great dissatisfaction existed in the town with the price and quality of the gas supplied. The charge for gas was about 5s. per 1000 cubic feet, while in Wexford, which was similarly situated, it was 2s. 9d. The estimated cost of the scheme was £5357. In answer to questions, the Town Clerk admitted that the Council never sent complaints to the Gas Company as to the quality, price, or pressure of the gas. Mr. P. O'Neill, J.P. (the Chairman of the Council), said he was one of the largest ratepayers in the town, and was strongly in favour of the scheme, which he would not support if he believed it was going to add to the rates.

Exmouth Gas Company.—The report adopted at the meeting of the Company last Tuesday stated that during the past year the business had had to contend with two adverse factors—a decreased yield from residuals and the urgent need of a new purifying plant. These had reduced the profits, as compared with the previous year, by £1729. Inasmuch, however, as the cost of new purifiers would not recur, the price of residuals was already improved, and there was a fair balance standing to the credit of the profit and loss account, the Directors were advised that they were justified in recommending the payment of dividends at the usual rates. The output of gas had attained such proportions that an enlargement of certain of the mains and the reconstruction of the carbonizing plant had become imperative; and the Directors contemplated undertaking this work. Every effort had been made to effect economies in the difficult times brought about by the war; but the rise in the price of coal, freights, and all materials was such that the Board were compelled to give notice that the price of gas would be raised 3d. per 1000 cubic feet to all ordinary and prepayment consumers. After no less than 29 years in the service of the Company Mr. J. T. Foster had, owing to ill-health, been obliged to resign his position as Secretary and Manager, and Mr. W. E. Dean had been appointed in his place.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *April 6.*

Owing to the holidays, there is nothing to report in the tar products market.

Manchester Tar Prices.

The average prices realized as the gross value of liquid products (without deductions for working expenses or discount) in the Manchester districts were as follows; January, 28s. 5d. per ton; February, 28s. 7d. per ton.

Tar Products in the Provinces.

April 6.

There is very little alteration in the markets for tar products, and on the whole there are not many new orders in the market. Benzol is steady, and fair prices are being paid. Solvent and heavy naphthas are in good demand, and high figures have been paid for delivery right up to the end of the year. Creosote is quiet, and very reasonable prices have been accepted for both prompt and forward delivery. Crude carbolic is steady.

The average values of gas-works products during the past week were: Gas-works coal tar, 21s. to 25s.; pitch, East Coast, 17s. to 18s.; West Coast, 18s. to 19s., Manchester; 19s. to 19s. 6d., Liverpool; 20s. 6d. to 21s. Clyde. Benzol, 90 per cent., naked, North, 9½d. to 10½d.; 50-90 per cent., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 2d. to 2s. 4d. Crude naphtha, in bulk, North, 5½d. to 5⅝d. Solvent naphtha, naked, North, 1s. 6d. to 1s. 7d. Heavy naphtha, naked, North, 1s. to 1s. 1d. Creosote, in bulk, North, 3d. to 3⅛d. Heavy oils, in bulk, 3⅞d. to 4d. Carbolic acid, casks included, 60 per cent., East and West Coasts, 3s. 4d. to 3s. 5d. Naphthalene, £8 to £15; salts, 65s. to 70s., bags included. Anthracene, "A" quality, 2d. per unit.

Sulphate of Ammonia in the Provinces.

LIVERPOOL, *April 1.*

Since the commencement of the week there has been no change in the situation of this article, and with the lack of improvement in shipping facilities the market has continued to have a downward tendency for near delivery. Approximate values at the close are £13 7s. 6d. per ton f.o.b. Hull, £13 8s. 9d. per ton f.o.b. Liverpool, and £13 17s. 6d. per ton f.o.b. Leith. Manufacturers have maintained their quotations for July-December delivery at £13 2s. 6d. to £13 5s. per ton, according to the port of shipment, but buyers have shown little disposition to operate at this level.

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Nitrate of Soda.

The tone of this market has continued very firm, and the spot prices have been raised to 11s. 9d. per cwt. for ordinary, and 12s. 1½d. for refined quality.

Sulphate of Ammonia.

From another source it is reported that this market has remained very quiet throughout the past week, and that prices are practically unaltered. Outside London, makes are quoted at £12 17s. 6d.; Leith, £13 17s. 6d. to £14; Liverpool, £13 12s. 6d. to £13 15s.; Hull, £13 10s. to £13 12s. 6d.; Middlesbrough, £13 12s. 6d.

COAL TRADE REPORT.

Northern Coal Trade.

The holidays have influenced the coal trade in more than one way. There has been an arrival of tonnage; and as the collieries had orders well booked, this full supply of steamers has made early loading unlikely and the quotations for that loading largely nominal. In addition, the output will be reduced for some days yet. For steam coals, best Northumbrians are from 30s. per ton f.o.b.; but the sales are few. Second-class steams are about 27s. 6d. per ton; and steam smalls are from 14s. to 16s. per ton. The work is now better at the mines, apart from holidays. In the gas coal trade, the demand is good, and the exports begin to show an increase; while the opening-out of navigation will further enlarge the quantities, and will make up for the lessened home consumption through the longer days. Best Durham gas coals are still quoted at 22s. 6d. per ton f.o.b.; and second-class kinds are 21s. per ton. "Wear Specials" are rather scarce, and may be put as from 22s. 6d. to 23s. 6d. per ton f.o.b. It may be added that the rates of freight are again lower; Tyne to London being near 7s. or 7s. 6d. per ton—a rate that is much above the normal, but also much lower than that of a few weeks ago. Not much is doing in contracts at present; but there are some inquiries. In the coke trade, the market is very strong at high prices for export; and this influences gas coke. Good Durham gas coke is now about 15s. 6d. to 16s. per ton f.o.b. in the Tyne.

Expected Increase in Salford Gas Charges.—It is reported that at to-morrow's meeting of the Salford Town Council a recommendation will be submitted from the Gas Committee relative to increasing the price of gas forthwith. A special meeting of the Gas Committee has been called for this (Tuesday) evening. At the moment of writing, the extent of the increase had not, says our correspondent, been fixed; but it is generally recognized in the borough that gas will be dearer, as most, if not all, Lancashire gas undertakings have been hit owing to the increased price of coal and the decreased residual yield.

Gas Prices Increased at Birstall.—At Birstall, Yorkshire, the price of gas has been increased as follows: For lighting, from 3s. to 3s. 3d. per 1000 cubic feet, with a discount of 5d. if paid within a stated period; for engines, cookers, &c., from 2s. 3d. to 2s. 11d., with 5d. discount; gas sold by prepayment meter, from 3s. 1d. to 3s. 4d. Coke has been advanced 10d. per ton.

Gas v. Electricity at Loughborough.—Arising out of the proposal of the Loughborough Electrical Engineer to inaugurate a system of electrical cookers and heaters in the borough, a vigorous protest has been entered by the Chairman of the Corporation Gas Committee (Councillor Charles), who pertinently argues that municipal undertakings should not be looked upon as "milch kine." Moreover, his contention, to which he has recently given public expression, is that "such undertakings should not be allowed to so overdevelop themselves that they become permanently attached to the rates after the manner of sucking calves." The imagery is completed by Mr. Charles's emphatic enunciation: "We have such an electric calf at Loughborough."

Gas Profits and the Rates at Burton.—An announcement was recently made by the Burton-on-Trent Corporation Gas and Electricity Committee that, instead of the £7000 hitherto given to the relief of the rates, only £4000 would be allocated this year. It was pointed out that this reduction of aid, coupled with the war allowances to Corporation employees with the forces, and the contemplated war bonus for those remaining, and other extraordinary expenditure, would mean an additional rate of about 1s. in the pound. The various Committees were asked to revise their estimates; and at a meeting of the Gas and Electricity Committee last week, it was decided, in view of the special circumstances, to give a further £1000 to the relief of the rates, making the total £5000. This represents about 1d. in the pound.

War Bonus Modified at Rochdale.—In the "JOURNAL" for the 23rd ult. (p. 765), it was reported that a joint conference of various Committees of the Rochdale Corporation had agreed to recommend the Town Council to grant a war bonus of 2s. per week to employees in receipt of less than 45s. The number of men in the Gas Department under this head was approximately stated to be 230; and the recommendation, if confirmed, meant an extra expenditure to the department of about £1200 annually. At a meeting of the Council last Thursday, Alderman Cunliffe pointed out that if the proposal was carried out by all departments of the Corporation, the cost would be £5000 per annum, which, with £2500 already being paid as half-wages to employees serving with the Colours, represented an additional rate of 4½d. in the pound to meet the charge. He thought the maximum amount of wages entitled to receive the bonus should be 30s., and he further suggested a time-limit for the bonus. An amendment was moved by Alderman Phillips that a war bonus of 2s. be given to employees not receiving more than 30s. per week, and 1s. to employees receiving between 30s. and 45s. per week. This was carried; the understanding being that the grant should be merely for the period of the war.

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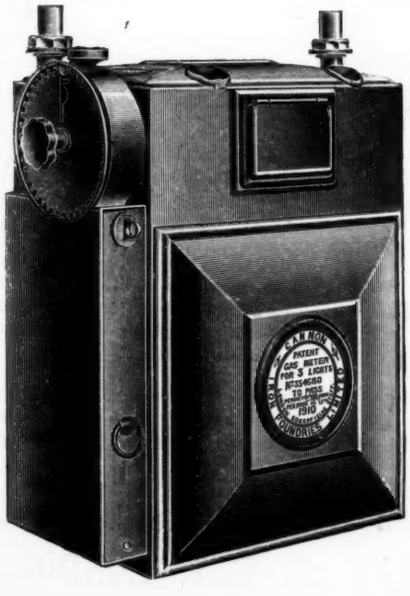

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Imperial Continental Gas Association.

Following up the paragraph appearing on p. 823 of last week's issue, it may be mentioned that, under date of the 1st inst., Mr. Robert W. Wilson, the Secretary of the Association, signs a notification to the proprietors in the following terms: "The Directors regret that, owing to the continued absence of returns from the stations, it will not be possible to prepare a report, balance-sheet, &c. They have, however, decided to recommend to the general meeting a distribution from the reserves of the Association of a sum equivalent to 2¼ per cent. on the £4,940,000 of capital stock of the Association. If this proposed distribution receives the approval of the general meeting, payment of the amount, less income-tax, will be made by dividend warrant in the usual way, payable on the 15th of May. The Directors who go out of office by rotation are Arthur Lucas, Esq., the Right Hon. Sir Guy Fleetwood Wilson, G.C.I.E., K.C.B., K.C.M.G., and the Hon. Sir Edward Chandos Leigh, K.C.B., K.C. The Auditor who goes out of office by rotation is C. F. Dendy Marshall, Esq., M.A. These gentlemen are eligible for re election, and offer themselves accordingly.

Pembroke Docks and Town Gas Company.—It was stated in the report which was adopted at the annual meeting of the Company that the working during 1914 showed a profit balance of £4480, including £599 brought forward. Final dividends at the rates of 10 and 7 per cent. were declared, leaving £1481 to carry forward.

Offer Accepted at Sheffield.—The employees of the Sheffield United Gas Company applied for an advance of 3s. per week in their wages; but it has been decided to accept an offer of 2s. a week, which will affect stokers, yardmen, gas-fitters, and some other sections. Youths are being advanced 1s. per week—all the rises to take effect as from the 12th ult. It is understood that the management will grant an interview to a deputation of the men before any reduction of the wages is brought about.

Dearer Gas at Tipton.—Referring, at a meeting of the Tipton District Council, to a recommendation of the Gas Committee that the price of gas be increased 3d. per 1000 cubic feet, Mr. Doughty said the Committee had to pay 5s. per ton more for the coal used at the works, and contracts for the supply at this advance for the next twelve months had been entered into. There were increases in wages amounting to about £150 a year. He did not know what further extension of the works would be necessary in the near future. They were now working up to their full capacity, and the new plant was satisfactory. He trusted that the expenditure on the works until the completion of the war would be limited to something less than £2000. Having regard to the present excessive charges for materials, &c., it would be unwise to duplicate the new plant until after the war was finished. He could not hold out any hope that the present increase in the price of gas would be sufficient, as it was highly probable that in the near future there would be another similar increase.

Securing the Safety of Gas and Water Mains.

With the object of securing the safety of gas and water mains, Mr. Harrison (the Chairman of the Gas Committee) moved, at the last meeting of the Keighley Town Council, that it be an instruction to the Water, Gas, and Electricity Committees in future to lay their pipes and mains in such a way that there shall be a distance of at least a foot between any electric cable and water or gas pipe; and that where it is found absolutely necessary to lay them at a less distance, flagstones 3 inches thick and of a width not less than one-and-a-half times the external diameter of the pipe, be laid between the cable and the pipe. They had had one case recently, he said, where an 18-inch trunk gas-main had been fused within 12 feet of the boiler of a large works in the town; so they would see how great the danger was. Mr. Whitehead (the Chairman of the Electric Light Committee) seconded the motion, but suggested that the earthenware troughs recommended by the Board of Trade for the purpose were preferable to flagstones. Mr. Harrison said he was not satisfied about the efficacy of the troughs. He believed the pipe he had mentioned as having been fused was laid in a trough. Alderman Mitchell moved, as an amendment, that the matter be referred to the three Committees concerned to confer as to the best means of preventing such occurrences as had been referred to. This was seconded by the Mayor, and carried.

Gas v. Electricity at Cahir.—A public meeting at Cahir, co. Tipperary, considered the local Gas Company's proposal to increase the price of gas to 6s. 6d. per 1000 cubic feet for lighting and to 5s. 6d. for other purposes; and it was decided to form a Company to instal the electric light. A letter from the Chairman of the Gas Company stated that the rise in the price of gas was due to the increased cost of coal.

South Metropolitan Company's Increase in Price.—Referring to this matter as "Hard Times—for the Present," the Editor of the South Metropolitan Company's "Co-Partnership Journal" for the current month says: "It is not difficult to realize the reluctance and regret with which the Directors yielded to the pressure of circumstances and advanced the price of gas. The step was a serious one, for it involved great reductions in dividend and bonus, and it could not be looked upon by the most sanguine as an inducement to the public to increase the consumption of gas. It is, therefore, evident that it was only taken because it was imperatively necessary. . . . Every co-partner must now nerve himself to the effort to get the price of gas reduced at the earliest possible moment. The great desideratum is the restoration of peace; and hundreds of our co-partners are fighting to achieve this. But those of us who are 'carrying on' in their absence may find ways of increasing business and saving materials; for every little helps, and there is still some room for improvement. The consideration which the Directors have shown, and are showing, for their employees should be met by an enthusiastic rally to their assistance in restoring the old prosperity with all possible speed."

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Gas for Heating Bakers' Ovens in America.

In the course of a paper on "The Industrial Appliance Business," read by Mr. W. H. Bradley, the Manager of the Springfield (Mass.) Gas Company, at the last meeting of the New England Association of Gas Engineers, he gave the following as a typical example of the Company's efforts to secure business: "Our man had been endeavouring for a long time to induce the owner of a hotel to instal a gas baking-oven to displace a coal one which he had been using. In order to convince him of its desirability, our man took him to a hotel where some time previously one had been installed, The baker was working with the oven at the time, and liked it; but the proprietor thought the bills were high. The visitor asked what work was done with the oven; and he found that they baked each day about the following quantities of food: 82 2-lb. loaves, 5 dozen pies, and 50 dozen rolls, and such roasts of meat or other food as might be required. He inquired as to how much the gas bill was; and the proprietor said his bill for the previous month was $15. Without any hesitation, the visitor said: 'Get me one of these ovens, and if I can do that work for twice the money I will be satisfied.' This $15 included gas used for a doughnut cooker, where they fried about 30 dozen doughnuts each day. The person to whom we sold the installation takes every opportunity of telling us how pleased he is with his equipment. Since that time, nearly every hotel and restaurant in our city has been equipped with ovens and other appliances."

Petrol Lighting for Isolated Buildings.—At the Ipswich Water-Works, petrol vapour is used for lighting the buildings, which have lately been visited by Mr. W. Ingham, the Chief Engineer to the Rand Water Board, who has made a report thereon to the Board. He states that 1 gallon of petrol will give light equivalent to 7000 candle-power-hours, or, in other words, 700-candle power for ten hours. For isolated lighting, Mr. Ingham says he does not know of anything more economical or simple to work.

Price Raised at Hastings.—The Hastings and St. Leonards Gas Company notify consumers, with much regret, that, owing to the war effect on coal, freightage, residuals, &c., it is necessary to increase the price of gas 4d. per 1000 cubic feet, as from the April meter-readings. The increase in price, which affects both consumers and proprietors under the sliding-scale, will, it is added, be modified or withdrawn as soon as circumstances render this practicable.

Leamington Priors Gas Company.—Moving the adoption of the report and accounts, and the declaration of dividends of £1 per share on the "A" shares, 14s. on the "B" shares, and 9s. 10d. on the "C" shares, Dr. Thursfield (who presided at last week's meeting of the Company) said there had been a large rise in the price of coal. Rates and taxes had also gone up by no less than £374 in the last half year, chiefly owing to the assessment of the gas-works having been considerably advanced. The most satisfactory point in the balance-sheet was an increase of £584 in the sales of gas. A weekly war bonus had been granted to the employees.

Chelmsford Gas Bill.—The Parliamentary Committee reported at the monthly meeting of the Chelmsford Town Council that the petition of the Gas Company against the Corporation Gas Bill had now been withdrawn. The Mayor (Alderman G. W. Taylor) said that, after negotiations with the Chelmsford Rural District Council, they also withdrew their opposition to the Bill, and the Committee secured this advantage upon very reasonable grounds. Since they had been negotiating in respect to the matter, the Treasury had intimated that, in common with other Acts, they had introduced a clause restricting borrowing during the war and one year after, except with the Treasury's consent. The Committee were negotiating with the Gas Company upon this point, and later on they would hear more about it. Practically they had given nothing away, and had got rid of the opposition. They could congratulate themselves upon the position as it now stood. Alderman Spalding said the Council and the burgesses were very grateful to the Mayor for the way in which he, with the Town Clerk, had carried this matter out.

GAS COMPANIES IN THE STOCK EXCHANGE.

Business on the Stock Exchange last week was naturally on a very reduced scale, with a working period of only four days and an interregnum of Easter Holidays in prospect. But, short as it was, the week exhibited a continued tone of cheerfulness from start to finish. Markets of almost all sorts were buoyant, and prices gathered strength. Among the most favoured were Government issues and high-class investments, while several of a more speculative character were in good demand. In addition to satisfactory war intelligence, financial factors at home influenced the brighter tendency. The increase in the revenue, the success of the Canadian Loan (largely over-applied for), and a like demand for the 15 million of Treasury Bills, all inspired firmness. Business in the Gas Market was quiet, as elsewhere; but it evinced no weakness, and prices in one or two important lines indicated growing strength. Alliance and Dublin signalized its return into the dividend-paying fold by great activity and higher figures. Primitiva, on the other hand, announces that, owing to the financial crisis in Argentina, there will be no final dividend on the ordinary shares. Imperial Continental proposes to distribute 2½ per cent. out of reserves next month. Croydon had a successful issue of £25,000 5 per cent. maximum at a premium.

Bargains done for cash during the week were as follows: On Monday, Alliance and Dublin 71⅛, 72, British 40⅝, 40⅞, Gas Light ordinary 85½, ditto debenture 69¾, Imperial Continental 82½, 83, ditto debenture 79, 79½, Primitiva 4⅜, South Metropolitan 91, 91½. On Tuesday, Alliance and Dublin 71½, 72, Gas Light ordinary 86¼, 87, 87½, ditto preference 85, Primitiva preference 4½, ditto debenture (1911) 76½, South Metropolitan debenture 67, South Suburban 100, 100½, Tottenham "B" 110, Sheffield "B" 214. On Wednesday, Alliance and Dublin 71⅛, 72, Bombay, 5 7/16, 5 11/16, Gas Light ordinary 86¼, 87, 87⅛, 87⅜, ditto debenture 69½, 70, Primitiva preference 4⅛, 4 3/16, 4 5/16. On Thursday, Alliance and Dubiin 71⅛, 72, 72⅛, Gas Light ordinary 87, 87⅜, 88, South Metropolitan 91, 92, ditto debenture 67, Sheffield "C" 212, Tottenham "B" 113, 113½.

Bank rate (fixed Aug. 8), 5 per cent.; last year, 3 per cent.

LOWEST AND HIGHEST PRICES OF BARGAINS DONE FOR CASH IN THE WEEK ENDING APRIL 3.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices. July 30.	Yield on Highest Closing Price.	Lowest and Highest Prices of Bargains.
£			p.c.			£ s. d.	
1,551,868	Stk.	April 8	2½	Alliance & Dublin Ord.	59—64	3 18 2	71⅛—72½
874,000	,,	July 10	4	Do. 4 p.c. Deb.	76—79	5 1 3	..
280,000	,, 5	April 29	7½	Bombay, Ltd.	5⅞—6⅜	5 17 8	5 5/16—5 11/16
50,030	10	Feb. 26	16	Bournemouth Gas and Water — 10 p.c.	29—30	5 6 8	..
373,480	10		7	Bournemouth Gas and Water — B 7 p.c.	15—15½	4 10 4	..
95,000	10	,,	6	Bournemouth Gas and Water — Pref. 6 p.c.	13½—14	4 5 9	..
—	—	—	—	Bournemouth Gas and Water — Deb.	..	—	..
880,000	Stk.	Feb. 26	14	Brentford Consolidated	261—266	5 5 3	..
330,000	,,	,,	11	Do. New	204—209	5 5 3	..
50,000	,,	,,	5	Do. 5 p.c. Pref.	109—111	4 10 1	..
206,250	,,	June 11	4	Do. 4 p.c. Deb.	91—93	4 6 0	..
217,380	Stk.	Feb. 26	11	Brighton & Hove Orig.	208—213	5 3 4	..
244,200	,,	,,	8	Do. A Ord. Stk.	154—159	5 0 8	..
530,000	20	Mar. 26	13½	British	44—45	5 11 1	40⅝—40½
120,000	Stk.	June 26	4	Do. 4 p.c. Deb. Stk.	88—90	4 8 11	..
245,771	Stk.	June 26	4	Buenos Ayres 4 p.c. Deb.	85—87	4 12 0	..
100,000	10	—	—	Cape Town & Dis., Ltd.	1½—2½	—	..
100,000	10	—	—	Do. 4½ p.c. Pref.	4—6	—	..
100,000	Stk.	June 26	4½	Do. 4½ p.c. Deb. Stk.	70—75	6 0 0	..
157,150	Stk.	Feb. 26	5	Chester 5 p.c. Ord.	108—110	4 10 11	..
1,513,280	Stk.	Feb. 12	5/9/4	Commercial 4 p.c. Stk.	106—108	5 1 2	..
560,000	,,	,,	5½	Do. 3½ p.c. do.	103—105	5 1 6	..
475,000	,,	June 11	8	Do. 3 p.c. Deb. Stk.	69½—71½	4 3 11	..
800 000	Stk.	,,	4	Continental Union, Ltd.	76—79	5 1 3	..
200 000	,,	,,	7	Do. 7 p.c. Pref.	115—118	5 18 8	..
—	—	—	—	Croydon B and C 7 p.c.	..	—	..
492,270	Stk.	—	6	Derby Con. Stk.	123—125	4 16 0	..
55,000	,,	—	4	Do. Deb. Stk.	102—104	3 16 11	..
1,002,180	10	July 29	10	European, Ltd.	17½—18	5 11 1	..
16,362,910	Stk.	Feb. 12	4/17/4	Gas — 4 p.c. Ord.	98—102	4 15 6	85½—88
3,600,000	,,	,,	3½	Gas — Light 3½ p.c. max.	76—79	4 8 7	..
4,062,235	,,	,,	4	Gas — and 4 p.c. Con. Pref.	96—99	4 0 10	85
4,674,850	,,	June 11	3	Gas — Coke 3 p.c. Con. Deb.	72½—74½	4 0 6	69½—70
258,740	Stk.	Mar. 12	5	Hastings & St. L. 3½ p.c.	87—89	5 12 4	..
70,000	10	April 29	11	Hongkong & China, Ltd.	16½—16¾	6 11 4	..
—	—	—	—	Hornsey 7 p.c.	..	—	..
131,000	Stk.	Mar. 12	7⅞†	Ilford A and C	151—154	5 2 4	..
65,780	,,	,,	6⅜†	Do. B	115—118	5 8 0	..
65,500	,,	June 26	4	Do. 4 p.c. Deb.	92—94	4 5 1	..
4,940,000	Stk.	May 14	9	Imperial Continental	150—160	5 12 6	82½—83
1,235,000	Stk.	Feb. 12	8½	Do. 3½ p.c. Deb. Red.	84—86	4 1 5	79—79½
200,242	Stk.	Mar. 12	6½	Lea Bridge Ord. 5 p.c.	119—121	5 7 5	..
561,000	Stk.	Feb. 26	10	Liverpool 5 p.c. Ord. (A)	211—213	4 13 11	..
718,100	,,	,,	—	Liverpool 5 p.c. Ord. (B)	146—148	4 14 7	..
306,083	,,	June 26	4	Do. 4 p.c. Pr. Deb. Stk.	..	—	..
75,000	5	June 11	6	Malta & Mediterranean	4½—4¾	6 9 9	..
250,000	100	April 1	4½	Met. of Melbourne 4½ p.c. Deb.	99—101	4 9 1	..
541,930	20	May 28	4	Monte Video, Ltd.	11½—12	6 13 4	..
1,775,892	Stk.	July 29	4½	Newc'tle&G'tesh'd Con.	99½—99½	4 10 6	..
529,705	Stk.	June 26	8½	Do. 8½ p.c. Deb.	82—83	4 4 10	..
55,940	10	Feb. 26	7/14/0	North Middlesex 7 p.c.	14—15	5 2 8	..
300,000	Stk.	May 14	8	Oriental, Ltd.	117—122	6 11 2	..
60,000	5	Mar. 26	10	Ottoman, Ltd.	7⅞—7⅞	6 9 0	..
60,000	50	Feb. 26	13	Portsea, Island B	128—131	4 19 3	..
100,000	50		12	Do. C	118—121	4 19 2	..
249,980	5	April 29	8	Primitiva Ord.	5½—6	6 13 4	4⅜
499,960	5	June 26	5	,, 5 p.c. Pref.	4⅝—5	5 0 0	4 5/16—4 7/16
521,600	100	June 2	4	,, 4 p.c. Deb.	91—93	4 6 0	..
—	—	—	—	,, ,, 1911	..	—	76½
346,198	Stk.	June 26	4	River Plate 4 p.c. Deb.	85—87	4 12 0	..
150,000	10	May 14	6	San Paulo 6 p.c. Pref.	10½—11	5 9 1	..
125,000	50	July 1	5	San Paulo 5 p.c. Deb.	47—49	5 2 0	..
135,000	Stk.	Mar. 12	10	Sheffield A	233—234	4 9 3	..
209,984	,,	,,	10	Do. B	232—234	4 9 3	2¼
523,500	,,	,,	10	Do. C	220—222	4 10 1	212
90,000	10	May 28	9	South African	10½—11½	7 16 6	..
6,429,895	Stk.	Feb. 12	5/9/4	South Met., 4 p.c. Ord.	111—113	4 16 8	91—92
1,895,445	,,	July 10	3	Do. 3 p.c. Deb.	72½—74½	4 0 6	67
309,830	Stk.	Feb. 26	8½	South Shields Con. Stk.	157—159	5 6 11	..
952,795	Stk.	Feb. 26	6	S'th Suburb'n Ord. 5 p.c.	114—116	5 3 5	100—100½
60,000	,,	,,	5	Do. 5 p.c. Pref.	110—112	4 9 3	..
—	—	—	—	Do. West Kent.	..	—	..
137,058	,,	June 26	5	Do. 5 p.c. Deb. Stk.	116—118	4 4 9	..
629,740	Stk.	May 14	5	Southampton Ord.	99—102	4 18 0	..
120,000	Stk.	Feb. 12	7⅛†	Tottenham A 5 p.c.	135—138	5 8 8	..
742,275	,,	,,	6†	Tottenham B 3½ p.c.	115—117	5 2 7	110—113½
181,255	,,	June 26	4	Tottenham 4 p.c. Deb.	87—89	4 9 11	..
182,380	10	Dec. 30	5	Tuscan, Ltd.	5—6	8 6 8	..
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	93—95	5 5 2	..
236,476	Stk.	Mar. 12	5	Tynemouth, 5 p.c. max.	103½—109½	4 11 4	..
30,000	Stk.	Feb. 26	8⅜	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	5 7 4	..
255,636	,,	,,	6¾	,, B 3½ p.c.	129—134	5 2 7	..
108,075	,,	,,	5/17/8	,, C 3½ p.c.	110—115	5 2 0	..
352,000	,,	,,	6½	Wimbledon 5 p.c.	117—122	5 0 5	..
98,000	,,	,,	6⅜	Epsom 5 p.c.	121—126	5 5 2	..
88,416	,,	June 26	8	3 p.c. Deb. Stk.	66—69	4 6 11	..

x Bargains marked thus were "Ex Div."

Increased Price at East Hull.—The Directors of the East Hull Gas Company notify an advance in the price of gas from 2s. to 2s. 3d. per 1000 cubic feet, as from the 31st ult.

Newton-le-Willows Gas Workers' Wages Increased.—The Newton-le-Willows District Council resolved, at a special meeting, to grant increases in wages of 3s. per week to all employees in the Gas Department receiving less than 30s. per week, and 2s. per week to employees who receive over 30s., but under 40s.

Long Outstanding Gas Bill Paid.—There was received in the mail at the Jersey City office of the Public Service Gas Company on the 16th of February last two 1$ bills and 45 c. in stamps, in payment of a bill for gas consumed in October, 1875—forty years ago. The bill enclosed with the money showed that it was rendered by the People's Gas Company of Jersey City. The remittance was regarded as the result of a consumer's troubled conscience, probably of many years' standing. The price of gas at the time was $3.50 per 1000 cubic feet; making a charge of $2.45 for 700 cubic feet.

Flueless Geysers in Bath-Rooms.—Evidence given at an inquest on the body of a widow named Adelaide Hufted, who resided at Catford, showed that she was found sitting in her bath, with her head bent forward and her face covered by the water. The bath was full, and the water was escaping by the overflow. It was running through the geyser cold. The bathroom window was open a little; but there was no vent for the geyser. A doctor said death was due to suffocation. He thought deceased became faint, and fell forward with her face in the water. The Jury found that death occurred from suffocation through immersion in the bath, but that there was no evidence to show how it came about. They recommended that the householder should be advised to provide a flue for the geyser.

London County Council and Gas Inspection.—At the meeting of the London County Council last Tuesday, the Public Control Committee presented a report on the staff in their department. In connection with gas testing, they pointed out that the present Inspecting Gas Examiner is a second-class assistant in receipt of £200 a year, with a personal allowance, rising to £50 by four equal annual instalments. In effect the scale of pay is £200, rising by annual increments of £12 10s. to £250; and the Committee suggested that the opportunity should be taken to fix the salary accordingly. They had had under consideration the question of the position of the Council's gas examiners generally, in view of the alterations in the duties of certain of their number affected by the passing of the Gas Light and Coke Company Act of last year; but they suggested that the staff should be fixed as at present. The report was adopted.

Bexhill Water and Gas Company.—The report submitted at the half-yearly meeting of the Company last Tuesday stated that the accounts for the six months ended Dec. 31 showed a balance at credit of profit and loss account available for dividend of £8083. The Directors recommended that a dividend be declared for the half year at the rate of 6½ per cent. per annum on the capital of £34,000 authorized by the Acts of 1885 and 1892, and at the rate of £4 11s. per cent. per annum on the capital of £123,710 authorized by the Act of 1896, Order of 1901, and Act of 1904—less income-tax. This, with provision for income-tax, would absorb £3919, leaving £4164 to be carried forward. Notwithstanding that the summer season at Bexhill was severely prejudiced by the outbreak of war, and that the early closing of licensed premises and restrictions with regard to illumination of shops ordered by the Government had since acted prejudicially on the lighting, the Directors were gratified in being able to report that the business of the Company continued to progress; the total revenue from water and gas having amounted to £13,856, against £13.059 in the corresponding half of 1913, or an increase of 6 per cent. But for the war, the Directors would have felt justified in recommending an additional dividend. In face, however, of the uncertainty prevailing as to the future, they deemed it more prudent to defer this for the present, and increase the balance carried forward by £690.

War Bonus at Hampton Court.—The Hampton Court Gas Company have decided to give a bonus to their workmen during the war, owing to the increased cost of living. Young men whose wages are under £1 a week will receive an advance of 1s., and all earning over £1 a week an increase of 2s.

Employee Shareholders of the Melbourne Gas Company.—There is in existence in Melbourne an Association of which the object is to facilitate the acquisition by the Gas Company's employees of shares in the undertaking. Each employee who is a member of the Association makes a small contribution weekly to the funds, and with the money thus acquired shares are purchased at intervals. The Association became a modest shareholder in the Gas Company in 1908, when the first ten shares were purchased at an average price of £10 7s. Other shares were bought subsequently until at the end of 1913 the Association possessed 263 shares in the concern. During 1914 the Association added to its interest no fewer than 217 shares, at an average cost of less than £10 1s. 6d. One hundred of these were purchased at the public sale of 10,000 shares a few months ago, and as things have turned out the executive's scheme to purchase the shares with money secured on loan has proved a smart piece of business. To purchase the shares, the Association had to obtain £660 on loan at 5½ per cent. As the present market value of the shares is £10 7s., against £9 17s. paid for them, and as a dividend has already been received, the amount gained is expected to be between £60 and £70. The dividends obtained by the Association last year amounted to £255 2s. 6d. By the time the next dividend is received, the Association expects to have a credit of £5000. During 1914-15, the membership of the Association increased from 550 to 940. The President of the Association, Mr. H. J. Hartley, was re-elected at the recent meeting of the Association.

The Enniskillen Gas Company have increased the price of gas by 5 per cent., owing to the advance in coal prices.

At Flockton, near Wakefield, gas has just been installed in the township, and was used for lighting for the first time last week. Hitherto all the buildings in the place have had to depend upon oil lighting.

In consequence of the increased cost of coal and the higher cost of materials, the Cradley Heath, Halesowen, and Rowley Regis and Blackheath Gas Company have decided to advance the price of gas by 3d. per 1000 cubic feet.

At a meeting of the Oldbury District Council last Wednesday, the Gas Committee reported that they had considered an application from certain employees for an increase in wages to meet the higher cost of living, and had granted, as a war bonus, an advance of 2s. a week.

The Directors of the Primitiva Gas Company announce that, owing to the grave financial crisis in the Argentine Republic and the effects of the war, they are unable to recommend a final dividend on the ordinary shares. An interim dividend of 2½ per cent. was paid in October last.

The Birmingham Corporation electric supply sub-station in Alma Street was last Wednesday the scene of a somewhat serious accident, when a man named Alexander Mitchley was severely burned. Owing to the fusing of a wire, an explosion took place, and Mitchley was knocked down and rendered unconscious. A man named M'Donald, in rescuing his comrade, was rather badly burned.

The Tipton Urban District Council Gas Committee have decided to devote the sum of £600 from the profits of the gas undertaking for the past financial year in relief of the rates. Seventeen general labourers in the employ of the department have sent an application to the Manager (Mr. W. Prince) for an advance in their wages; and the Committee have agreed to increase the rate of pay to the general rate of the district—viz., 23s. per week—compared with 22s. 6d. per week, the present rate.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

GAS ENGINEER AND MANAGER. Nelson Corporation. Applications by April 17.
ASSISTANT MANAGER. Merthyr Tydfil Gas Works. Applications by April 17.
DRAUGHTSMAN. No. 6014.
INSPECTOR (GAS FITTING, &c.). No. 6015.
WORKS FOREMAN. Beccles Gas Company.
STOKER. Holmfirth Gas Works.

Gas-Works for Disposal. No. 6011.

Plant, &c. (Second-Hand), for Sale.

DRY METER (300 LIGHT). Thos. McLaren and Sons, Kirkcaldy.
GAS WORKS PLANT AND APPLIANCES. Middlesbrough Corporation. Offers by April 19.
SCRUBBER. John Adams and Sons, Newcastle-on-Tyne.

Sales of Shares.

GRAYS AND TILBURY GAS COMPANY. London Mart. April 13.
ST. ALBANS WATER COMPANY. London Mart. April 13.

TENDERS FOR

Meter (Station).

DARLINGTON GAS DEPARTMENT. Tenders by April 22

Purifiers.

DARLINGTON GAS DEPARTMENT. Tenders by April 22.

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Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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